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THIRTEENTH ANNUAL REPORT

Oregon State Horticultural Society

THIRTY-SIXTH ANNUAL MEETING
FOREST GROVE, OREGON

December 1, 2, 3, 1921

STATE OF OREGON
1859

Thirteenth Annual Report

THIRTY-SIXTH ANNUAL MEETING

OF THE

Oregon State Horticultural Society

DECEMBER 1-2-3, 1921

FOREST GROVE, OREGON

ORGANIZED 1885
INCORPORATED 1901

Salem, Oregon
THE PACIFIC HOMESTEAD
1922

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FROM
OREGON STATE HORTICULTURAL SOCIETY
TO
COL. HENRY E. DOSCH
DEAN OF OREGON HORTICULTURALISTS
DEC. 1921

Oregon State Horticultural Society

Officers and Committees

Officers

B. W. JOHNSON, President, Corvallis
E. A. REUTER, Vice-President, Forest Grove
C. D. MINTON, Secretary-Treasurer, Portland

Board of Trustees

J. B. PILKINGTON, One Year, Portland
HENRY E. DOSCH, Two Years, Hillsdale
CHARLES L. McNARY, Three Years, Salem

Auditing Committee

ALBERT BROWNELL
S. A. BURT
J. B. PILKINGTON

Committee on Needed Legislation

ROBERT C. PAULUS, Salem
CHAS. A. PARKE, Salem
A. H. MARSH, Roseburg
IRA HUTCHINGS, Corvallis
L. T. REYNOLDS, Salem

Members

Honorary Members

Atwell, H. C. (1911), Forest Grove.

Cardwell, Dr. J. R.* (1897), Portland.
Cordley, A. B.

Dosch, Henry E. (1911), Hillsdale, Portland.

Lake, E. R. (1892), Pomological Dept., Washington, D. C.
Lambert J. H.* (1895,) Portland.
Lewis, C. I.
Luelling Seth* (1895), Milwaukie.

McDonald, M.
Miller, H. B. (1911), 509 E. 21st St. N., Portland.

Park, Chas. A.
Pilkington, J. B.

Quarnberg, A. A.

Reynolds, Lloyd T.
Reimer, C. E.

Smith, E. L. (1911), Hood River.
Starr, James E.* (1892), Portland.

---

*Deceased.

Life Members

Anderson, Nils P., McMinnville.
Armstrong, E. C., Salem.

Bateham, A. P., Portland.
Better Fruit Pub. Co., E. H. Shepard, Hood River.
Bridge Horticultural Society, Bridge, Coos County.
Brown, W. S., Chief Horticultural Dept., O. A. C., Corvallis.
Brownell, Albert, Sargent Bldg., Portland.
Bower, H. A., Eugene.
Brumfield, J. T., Portland.
Bryant, Hub, Albany.

Carter, J. L., Hood River.
Central Horticultural Society, Coquille.
Chase, W. E., West Ave. and E. Burnside, Mt Tabor, Portland
Clark, L. E., Hood River.
Coos Bay Fruit Growers' Association, Marshfield.
Cordley, A. B., Dean O. A. C., Corvallis.

Daugherty, Otis Ray, R. F. D. 1, Molalla.
Davidson, Frank L., Hood River.
Davidson, P. S., Hood River.

Eggert, Mrs. Fred'k, 205 14th St., Portland.
Elliott, Wm., Dallas.
Esterly, H. M., Yeon Bldg., Portland.

Fanning, A. M., Sheridan.
Fargo, G. K., 83 Fifth St., Portland.
Forbis, John F., Dilley.

Goodrich, A C.,* Yamhill.
Groner, Ferdinand, R. F. D. 2, Hillsboro.
Gibson, R. D., R. F. D. 5, Salem.
Gale, H E., Merlin.

Holt, J. O., Mgr. Eugene Fruit Growers' Association, Eugene.
Holaday, Asa, Scappoose.
Hows, Ed. L., Multnomah Hotel, Portland.

Johnson, J. Lewis, Eugene, Box 69.

Laidlaw, W. A., 1515 Belmont St., Portland.

McCargar, C. A., Yeon Bldg., Portland.
McDonald, M., Oregon Nursery Co., Orenco.
McGill, A., Beck Bldg., Portland.
McNary, U. S. Senator C. L., Salem.
Marcum, C. A., care Portland Hotel, Portland.
Mason, Julius L., Hood River.
Meier, Julius L., care Meier & Frank, Portland.
Minton, C. D., Portland.
Moulton, L. D., McMinnville.
Myrtle Point Horticultural Society, Myrtle Point.

Newell, W. K., Portland.

Park, Chas. A., Salem.
Paulus, R. C., Salem.
Pearcy, Earl, Dilly.
Pemberton, John, Salem.
Pilkington, J. B., Portland.
Power, Frank W., Oregon Nursery Co., Orenco.
Deceased.

Quarnberg, A. A., Vancouver, Wash.

Rees, J. H., Springbrook.
Reuter, Tillman, Madras.
Reynolds, L. T., Salem.

Roberts, E. C., Lebanon
Rumbaugh, H. G., Albany.

Sargent, Harry, U. S. Dept. Agriculture, Portland.
Settlemeier, Frank W., Woodburn
Deceased, 1914.
Swallow, C. W., R. F. D. 3, 118, Oregon City.
Wallace, F W., McMinnville.
Weber, R. H., The Dalles.
Westerlund, J. A., Medford.
Williamson, H. M., Secretary State Board of Horticulture, Portland.
Deceased, 1917.
Williamson, W. E., Portland.
Deceased, 1917.

Annual Members 1921

Beker, M. B., Yakima, Wash.
Bennett, A. B., Hood River.
Brenner, Frank, R. F. D. A, Eugene.

Calkins, W. W., Eugene.
Conoration, Ward Lea, Rockford, Ill.

Davis, W. H., 939 Mallory Ave., Portland.
Davis, Geo. E.
Dencer, Edward, Salem.
Dixson, J. H., 935 Patterson.
Dorris, Ben, Eugene.

Funk, H. G., Sheridan.

Harlow, M. H., Eugene.
Halfer, E. O.; Eugene.
Hobbs, Harry, Eugene.
Hutchings, Ira, Corvallis.

Jardine, J. T., Corvallis.

Kletzinger, W. B., Eugene

Larsen, James.
Launsberry, G. W., Astoria.
Lewis, Jno. E., Roseburg.
Lennon, C. O., O. G. P. C., Medford.

Merriman, C. A., Eugene.
Miller, F. W., Motor A., Eugene.
Miller, H. G., Eugene.
McAllister, Frank, Eugene.
McMiller, eKnneth C, Sheridan.

Needham, Frenk, Eugene.
Newman, Wm. H., R. F. D. 2, Springfield.
Nielson, J. P., R. F. D. A Box 213, Eugene.
Norton, F. J., Sutherlin.

Olmstead, F. A., Hood River.

Renner, J. H., Portland.
Rebham, Ira F., Eugene.
Roberts, Will, Eugene.
Robbins, H. A., R. F. D. 3, Eugene.

Sauinis, T A. Jr., The Dalles.
Stewart, C. E., Eugene.
Storet, M. A., Sheridan.

Thompson, W. E., Creswell.
Torry, Clayton L., Corvallis.

Walton, Wilmer, Motor A, Eugene.
Widmier, Geo., Eugene.

Annual Members 1922

Allen, Boyce, R. F. D. 9, Box 91, Salem.
Allen, A. C., Medford.

Baker, H. N., Newberg.
Barss, H. P., Corvallis.
Beebe, J., Eugene.
Bouquet, A. G. B., Corvallis.
Brown, F. V., Dallas.
Butner, Forest, Roseburg.
Barnett, James L., Eugene.

Campbell, Dougal, Eugene.
Chase, F. B., Eugene.
Chase, E. B., Eugene.
Currin, C. J., Monroe.
Currin, H. W., Drain.

Doyle, E. T., 425 Balter St., San Francisco, Calif.
Dearborn, G. A., Newberg.

Ebert, W. F., Forest Grove.

Farnham, H. W., R. F. D. 1, Hillsboro.
Fletcher, H. B., Indeepndence.
Forbis, R., Forest Grove.
Funk, H. G., Sheridan.

Gill, Ray, Portland.
Groner, Mrs. Ferd, R. F. D., Beaverton.

Himes, Geo. H.
Harvey, Joe, Roseburg.
Harlow, F. B., Eugene.
Himes, Geo. H., Portland.
Hart, J. I., R. F. D. 2, Eugene.
Hildebrand, August, Astoria.
Hazelet, H., Forest Grove.
Hartman, H., Corvallis.

Johnson, B. W., Monroe.

Kruse, C. W., Oswego.

Lafky, H. E., Forest Grove.
Larsen, B. A., Gaston.
Launsberry, G. W., Astoria.
Leedy, J. C., R. F. D. 3, Beaverton.
Lewis, C. I., Salem.
Lilly, D. G., Forest Grove.
Long, C. L., Corvallis.
Lovett, A. L., Corvallis.

Marsh, Geo., Lookingglass.
McWhorter, O. T., Hillsboro.

Maris, Paul V., Corvallis.
Miles, Joe A., Forest Grove.
McGee, John A., Orenco.
Moody, C. I., Better Fruit, Portland.

Neff, I. T., Forest Grove.
Nixon, R. P., Forest Grove.

Pancok, L. H., 3505 Sullivan St., St. Louis, Mo.
Purdin, I. E., Forest Grove.

Reuter, E. A., Forest Grove.

Schnister, C. E., Corvallis.
Stephens, E. F., Nampa, Idaho.
Shanahan, R. E., Dundee.
Silver, W. W., Dundee.
Stansberry, J. E., Portland.

Talbert, A. O., Corvallis.
Thomas, A. B., Forest Grove.
Thramer, John Eugene.
Tonnison, O. A., Tacoma.

Vander Born, Ignatz, Orenco.
Vincent, V. A., Newberg.

Waite, F. L., Eugene.
Weatherspoon, W. W., Elgin.
Wilson, H. C., Sheridan.
Weed, Howard E., Beaverton.

Zimmerman, Geo., Yamhill.

AMENDED ARTICLES OF INCORPORATION OF THE OREGON STATE HORTICULTURAL SOCIETY

Know All Men by These Presents: That we, the undersigned, Homer C. Atwell, of the County of Washington; Frank W. Power, of the County of Multnomah, and James R. Shepard, of the County of Polk, all in the State of Oregon, being officers of the Oregon State Horticultural Society, unincorporated, and having been duly elected to the respective offices hereinafter specified, in accordance with the usages and regulations of said Society, do hereby associate ourselves together for the purpose of incorporation, under and by virtue of the general incorporation laws of the State of Oregon, relative to religious, literary, benevolent, charitable and similar societies; and we do make, subscribe and adopt, in triplicate, these articles of incorporation, to-wit:

1. The name assumed by this corporation, and by which name it shall be known, is Oregon State Horticultural Society; and its duration shall be unlimited.

2. The object, business and pursuit of this corporation is, and shall be, as follows: (1) The development of agricultural and especially of those branches known as horticulture, floriculture, aboriculture, and forestry; (2) the development of landscape gardening, and of all arts, sciences and instrumentalities likely to elevate the character of the rural population and increase the profits, comforts and pleasures of rural life: (3) the collection, preservation and dissemination of knowledge relative to the foregoing and other kindred subjects: (4) the exploitation and development of all agencies tending to conserve the natural resources of the country, and to arouse the public to an interest in such conservations; (5) to acquire, own, hold, use, sell, and otherwise dispose of and convey real and personal property; to accept, receive and use gifts, devices, legacies, bequests, and legislative appropriations; to borrow money, and execute therefor its promissory notes, mortgages and other assurances; (6) to do any and all other acts and things which may be necessary, advisable or convenient, for the purpose of more effectually accomplishing the purposes aforesaid, or any of them.

3. The estimated value of the property and money possessed by said Society at this time is one hundred dollars; and the sources of its revenue or income is, and will be, dues of its members, subscriptions, donations, devices, legacies, bequests and legislative appropriations and any income which may be derived from the investment or use of any moneys or property so acquired.

4. The respective title of the officers making these articles are as follows: Homer C. Atwell, president; Frank W. Power, secretary-treasurer, and James R. Shepard, vice-president. They shall hold their respective offices until their successors therein shall be duly elected and qualified. Their successors in office shall be elected by a majority vote of the members of said Oregon State Horticultural

Society who are in good standing and present, and voting, at an annual meeting of said society on the first Tuesday of December, 1919; and on such other day and month of each succeeding year thereafter as may be designated in the by-laws of said society as the date of its annual meeting, said annual meetings to be held in the city of Portland, Oregon.

5. The location of said Society shall be in said city of Portland, in the County of Multnomah, and State of Oregon.

HOMER C. ATWELL, President,
J. R. SHEPARD, Vice-President,
FRANK W. POWER, Secretary-Treasurer.

We, the undersigned, A. P. Bateham, president; E. H. Shepard, vice-president, and Frank W. Power, secretary-treasurer of the Oregon State Horticultural Society, certify that at the annual meeting of the Society, held November 16, 1911, the following resolution was unanimously adopted:

Resolved, That the officers take the necessary steps to file amended Articles of Incorporation placing the legal powers of the Society in the officers and three trustees, in place of the officers alone, as at present.

In accordance with said resolution the following, to be known as Section 6 in the Articles of Incorporation will be appended as the amendment thereto:

> "Section 6. The management of the affairs of the Society shall be vested in the president, vice-president and secretary-treasurer and three trustees. They shall be elected at the annual meeting each year, which shall be held at such time as may from time to time be fixed by the by-laws. The officers and trustees shall hold office for such time as provided from time to time in the by-laws."

Signed in triplicate and sealed with the seal of the Society this fifteenth day of October, 1912.

A. P. BATEHAM, President.
E. H. SHEPARD, Vice-President,
FRANK W. POWER, Secretary-Treasurer.

Acknowledged before Notary Public.

AMENDED BY-LAWS OF THE OREGON STATE HORTICULTURAL SOCIETY

(Adopted November 20, 1912)

ARTICLE 1—The Society Year.

The Society year shall begin on the first day of January.

ARTICLE II—Membership.

Section 1. The membership of the Society shall consist of annual, life and honorary members.

Section 2. Any person who shall pay the annual membership fee of one dollar shall thereby become a member for the current year, ending with the opening of the next annual meeting.

Section 3. Any person who shall pay the life membership fee of ten dollars shall thereby become a life member and shall be excused from further payment of membership fees.

Section 4. Any person who in the opinion of the Society has done the Society or horticulture in general some especially valuable service may be elected to honorary membership by a two-thirds vote of the members present at any regular meeting and shall be excused from payment of all membership fees.

Section 5. Those who were honorary members before the incorporation of this Society shall continue to be considered honorary members, without further action of the Society.

Section 6. All members shall be entitled to the same rights and privileges.

ARTICLE III—Officers.

Section 1. The officers of this Society shall be a president, a vice-president, and a secretary-treasurer, and three trustees. The last four shall be under bond in such sum as the Society may designate for the faithful discharge of his duties.

Section 2. The president and secretary shall be ex-officio members of all committees except the auditing committees.

Section 3. The duties of said officers shall be such as usually devolve upon like officers in similar organizations; provided, that no bills shall be paid without the approval in writing of the president and secretary-treasurer; and provided further that a committee of three, to be chosen annually by the Society, shall audit all bills, reports and accounts and render a report thereon to the Society.

Section 4. The secretary shall, at each annual meeting, render a report showing:

First—The personal property of the Society in his hands.

Second—The irreducible funds, securities and bills receivable belonging to the Society, stating how such funds are invested, and the interest then accrued on the same and on the other securities and bills receivable. Said report shall cover all documents of permanent value or use.

Third—He each year shall render to the auditing committee a complete report of the cash receipts and disbursements for the preceding year and this report, together with the report of the auditing committee, shall be made a part of the proceedings and printed in the annual report.

Fourth—The premiums offered, and by whom offered, and what was the final disposition of same.

Section 5. The three trustees appointed by the Governor as a Board of Control of the state appropriation, together with the president and secretary of the Society, shall constitute an executive committee, which committee shall be empowered to transact any and all business of the Society that may be necessary between meetings of this Society.

The executive committee shall from time to time fix the compensation of the secretary of this Society as they may deem the requirements of the office may justify.

ARTICLE IV—Date of Annual Meeting.

The annual meeting shall be held on such days in November or December of each year as the officers may, from year to year, designate. The officers shall be elected on the afternoon of the second day of the annual meeting. The president, vice-president and secretary-treasurer shall take charge of their office on the first day of January next following their election and hold office for one year, or until their successors are elected and qualified.

The trustees shall be chosen in accordance with the Act of Legislature so long as an appropriation is given by the state, and unless otherwise provided therein shall hold office for three years. In case the legislature shall fail to grant an appropriation in any year, the trustees shall be elected for three years by the Society.

ARTICLE V—Other Meetings.

Section 1. Other meetings may be held at such times and places as the Society by vote at a previous meeting may designate.

Section 2. The president may call a special meeting at Portland by causing notice thereof to be mailed to each member at least five days previous thereto, such notice to state the object of such meeting.

Section 3. It shall be the duty of the president to call a special meeting whenever requesteed in writing so to do by fifteen or more members.

ARTICLE VI—Publications.

Every member shall be entitled, without cost, to one copy of all official reports published by the Society.

ARTICLE VII—Quorum.

Nine members shall constitute a quorum for the transaction of business, but a less number may meet, call to order, and adjourn from time to time.

ARTICLE VIII—Order of Business.

The following order shall be observed as a guide in the transaction of business at the annual meeting of the Society:

1. Call to order and reading of minutes of previous meeting.
2. Reports of officers.
3. Reports of committees.
4. Unfinished business.
5. New Business.
6. Election of officers.
7. Papers, addressess, etc.

ARTICLE IX—Rules of Practice.

Robert's Rules of Order shall govern the deliberations of the Society.

ARTICLE X—Irreducible Fund.

All life membership fees, together with the sum of $2,000.00 of the amount heretofore realized from the bequest of the late Cyrus E. Hoskins, the "Lambert Fund," and the "Cardwell Fund," shall be kept intact and invested in good securities, so as to produce a revenue, if possible, and only said revenue shall be expended by the Society.

ARTICLE XI—Personal Property.

The secretary shall be the custodian of all badges, banners, dies, medals, blanks, books and other property of the Society of value or suitable for future use; and shall exact from his successor an itemized receipt for said property, when same is transferred.

ARTICLE XII—Record of Reports.

The annual reports of the officers and of the auditing committee and all reports relative to the finances, or property of the Society, or the disbursements of its funds, shall appear in full in the record of transactions, in the order of their filing with the secretary following the record of the meetings at which the reports were presented. The treasurer's report shall be made to the auditing committee showing a full report of receipts and disbursements and said report together with report of the auditing committee shall be made a part of the proceedings.

Said reports may either be pasted upon said record, or copied, in which latter case the copy shall be attested by the secretary.

ARTICLE XIII.

The executive committee may, if they deem it advisable, lend the assistance of the Society in any display of fruits and products of the state.

ARTICLE XIV—Amendments.

New by-laws may be adopted and old ones changed or repealed by a two-thirds vote of the members present at any meeting; provided, notice of such proposed adoption, change or repeal shall have been given at the last previous meeting of the Society; and, provided, further, that a vote to change or repeal Article X shall be by yeas and nays, recorded on the record book of the Society. Said vote shall be taken only at an annual meeting, and after due notice given at the annual meeting next preceding the same.

REPORT OF MEETING

THURSDAY, DECEMBER 1, 1921

The meeting was called to order by the President, Mr. Earl Pearcy.

ADDRESS OF WELCOME

By Mayor Wm. Schultz

Mr. President, Officers and Members of the Oregon State Horticultural Society, we are pleased to welcome you.

The city of Forest Grove has the reputation of extending hospitality. We feel that we can do the work and do it right. We are interested in the Horticultural Society because it represents the producers.

For the last fifteen or sixteen years I have handled your products. Much credit is due to this society for many things which it has accomplished. Formerly, fruits and vegetables used to be sold from large sacks which stood around on dirty floors among cans of oil, sacks of grain and the like. Now, through your efforts, prunes, for example, are packed in popular-sized boxes. These boxes have glass covers and display the produce in an attractive manner that literally invites the sale of them. You have done many things of advantage to producer and dealer, both wholesale and retail.

While you are in our city, there will be no municipal judge nor recorder. We shall turn our city over to you and your needs and convenience. Mr. Pearcy, I appoint you Municipal Judge for the period of this meeting of the Oregon State Horticultural Society.

GREETING

By Henry E. Dosch, Portland, Oregon

Mr. Mayor, Mr. President, Mr. Secretary and horticultural friends—Greeting! To use a stereotyped phrase, it is always pleasant to meet friends of horticulture, but it is especially so to meet and greet you at a college town like Forest Grove. I thank you, Mr. Mayor, for your kindly greeting and welcome to your city and I know all will enjoy the hospitality you have so generously extended to us.

The older members present will remember gratefully President Marsh of your college who devoted his life to the education of the youths who were so fortunate as to be students under him, many of whom have left their mark on the history of Oregon.

This society was organized some thirty-six years ago, and after laboring some years, gave birth to the State Board of Horticulture and I have the honor to be a charter member, so to speak, of both.

At the organization of both, we were confronted with serious obstacles and much trouble. Fruit growing was still in its infancy and sadly neglected by growers, as evidenced by the gnarled, scrubby, moss covered trees, and worm eaten fruits, evidences of moss-backism and dormant intellect, but we had set out to overcome all these troubles by education and carefully coaching old and new planters.

The prune industry seemed at that time to take the lead sponsored by Dr. J. R. Cardwell, who was president of this society for twenty years and ten years of the State Board, faithfully assisted by Prof. E. R. Lake, secretary for twelve years, Samuel A. Clark, Jesse Bullock, A. W. Hidden, John H. Fletcher, W. K. Newell, J. R. Shepard, Dr. Sharpless, Dr. O. P. S. Plummer, C. H. Welch, H. W. Prettyman, Chauncey Ball, T. V. Sluman, H. C. Atwell, Earl Pearcy and myself.

The apple, which has since put Oregon on the map as "The Land of the Red Cheek Apple," was taken up by R. S. Wallace of Salem, H. B. Miller of Rogue River, E. L. Smith of Hood River, Geer and James Hendershott of the Grande Ronde Valley, H. H. Weatherspoon of Elgin, Dr. C. A. Macrum of Mosier and T. A. Sammis, Jr., of The Dalles.

The pear was fostered by the Stewarts and Albert C. Allen of Medford, R. S. Wallace of Salem, Emille Schanno of The Dalles, A. H. Carson of Grants Pass and Charles A. Parke of Salem.

The cherry by L. T. Reynolds of Salem, J. H. Lambert of Portland, Seth Lewelling of Milwaukie and Cyrus Hoskins of Newberg—and last but not least, the

French walnut, which fell to me, introducing them some thirty years ago and, after many years of experimenting, succeeded in the Franquette, Mayette and later the Columbia, a seedling of the Mayette, planted largely by Thomas Prince and Charles Trunk of Dundee, J. C. Cooper of McMinnville, hundreds of others and myself, endorsed by H. M. Williamson and C. D. Minton, both secretaries of the Board and Society; hence I feel, and rightfully so, that we, with the co-operation of Dr. James Withycombe, Dr. A. B. Cordley, Prof. A. L. Lovett, Prof. H. P. Barss, Prof. C. I. Lewis, Prof. W. S. Brown and other professors from the Agricultural Experiment Station at Corvallis, who are always ready and willing to assist and lend a hand for the good of the cause, have placed the fruit and berry industry on a high plane, and by our work so cheerfully given, have carried out Emerson's mission, who said, "You can help your fellow man, you must help your fellow man; yea! it is even a divine privilege to give to your fellow laborer the results of your best thoughts and experiments." This, friends, is the best greeting I can give you.

A few days ago I came across this poem, the contents of which applies to all of you here present:

TO MY SUCCESSOR

Here's a toast I want to drink
  To the fellow I'll never know,
To the fellow who's going to take my place
  When it's time for me to go.

I've wondered what kind of a chap he'll be
And I wish I could take his hand,
Just to whisper, "I wish you well, old man,"
In a way he will understand.

I'd like to give him the cheering word
That I've longed at times to hear;
I'd like to give him the warm handclasp,
When never a friend seems near.

I've learned my knowledge by sheer hard work,
And I wish I could pass it on
To the fellow who'll come to take my place
Some day, when I am gone.

RESPONSE

By Prof. H. P. Barss

I feel as though it were impossible, even in the smallest degree, to replace Col. Dosch in response to the welcome of the entertaining city. I am glad to have the chance to speak for our society and thank the city of Forest Grove and the community for their hospitality in inviting us here for our annual meeting. It is necessary to have cities of progressive people, not producers, to help our work along. The Horticultural Society wishes to express their thanks and appreciation for the hospitality of this city.

READING OF THE MINUTES OF LAST MEETING

Mr. Minton: As the minutes of the last meeting are in printed form, I move you that the reading of the minutes be dispensed with.

Motion carried.

PRESIDENT'S ANNUAL ADDRESS

By Earl Pearcy

Ladies and Gentlemen of the Oregon State Horticultural Society: One of the prime purposes of such gatherings as this is to promote good will and optimism among the fruit growers of Oregon. The original founders of the Horticultural Society believed that the annual meeting should serve as a clearing house for the problems of the fruit industry. For that reason an effort is made each year to invite prominent leaders of various branches of horticulture to be on the program. In order to prevent any one district from monopolizing the advantages of the society a policy was inaugurated several years ago of holding the annual meetings in different places from year to year. Thus if the Mountain will not come to Mohamet, Mohamet must come to the Mountain. Last December Eugene welcomed the visiting delegates at the annual convention. This year Forest Grove has kindly consented to act as host.

This city is the center of a rich fruit-growing district. In the past it has been overshadowed by other larger and more diversified districts of the state. Now, however, with splendid railway service on two lines, with a paved highway connecting it with the great consuming center of the state, with a revived cannery under competent management and with a modern packing plant, one of the units of the state-wide marketing organization, this district is rapidly taking its place alongside of Yamhill, Sheridan, Newberg, Salem, Dallas, Eugene and other well-known fruit sections of Western Oregon.

The Italian prune takes kindly to our rich and deep hill soils. The extent of the prune industry would amaze one who is not familiar with its scope. For miles back into the hills splendid young orchards have been set out and many of them are bearing heavy crops. Berries and other lines of horticulture have occupied the attention of planter of late years. An extensive nut industry centers around Forest Grove. It is a pleasure to state that the business men are co-operating in every way possible with the fruit growers and indeed, they have done much to make this meeting a success.

In many ways it has been a very trying year for the fruit-growers of the state. Forces beyond their control have wiped out the normal profits of the industry not only for one year but in many cases for two years, 1920 by rains and ruinous markets, 1921 by crop failures. Despite the discouragement which follows in the wake of such calamities, it is a pleasure to report that the morale of the industry is unharmed. Growers realize that fruit-growing is too basic a business to be ruined by one or two bad seasons. Favorable crops, better financial and marketing conditions and higher land values will all return in due time, and then the growers will again reap the rewards of their industry.

It is interesting to note that the care given our orchards is better and the quality of the fruit produced is improving each year. This can be attributed in a large way to such meetings as are conducted by this society, to excursions by groups of fruit-growers under the auspices of the farm bureaus, to demonstrations by extension specialists from our splendid Agricultural College, to meetings and field work done by the co-operative marketing associations and to the contact which paved highways and electric roads give with others interested in the same industry.

The average fruit-grower is approaching the coming year with a great deal of optimism. The prune trees were never in better condition, the fruit buds are large and well developed and barring unusual weather disturbances a heavy crop of prunes may be expected. Spraying weather was ideal this fall for the control of anthracnose and spraying was quite general. Apple growers have learned that scab and small apples are their worst enemies. Heavy plantings have been made to broccoli in the Willamette Valley for the first time on a large scale.

The walnut industry in this state is assuming considerable proportions. California is the leading walnut producing state in the Union with 85,000 acres planted. Oregon comes second with some 8000 acres. This is one of the most promising fruits grown in the state. The one dark cloud on the horizon is the Chinese or Manchurian walnut industry. This society took sides with the California Walnut Growers Association last spring in their fight before the tariff committee in Congress to raise the duty on walnuts. Our efforts were not entirely successful. The Chinese nut is a poor quality product but comes in so cheaply that it will in time harm our industry. If the Chinese raised a walnut the equal of our better varieties it would be a question whether we could withstand the competition on our own markets. Unfortunately it came to our attention during the year that a nursery in Oregon had sold scion wood from grafted walnuts for exportation to China. If this rumor is true it is no less than a calamity, because if the Chinese once commence to remake their groves to the better western varieties such as the Franquette and Mayette in ten years time the yellow peril will indeed be upon us. I believe that the society should express itself vigorously on such action.

The co-operative fruit marketing organizations of the Pacific Coast states deserve mention for the splendid manner in which they have weathered the recent financial crises. These associations have been growing in the face of disastrous marketing conditions and much of the quick come-back in the demand and rising prices for certain fruits can be attributed to them. California has been the pioneer, perhaps, in the great organizations which have been built up in that state such as the California Prune and Apricot Association, the Associated Raisin Company, the California Walnut Growers Association, and others. The Oregon associations have apparently lived through the critical period, and are now accepted as permanent institutions.

The position which Oregon possesses as one of the leading fruit states of the Union is due in no small part to the splendid work of the Oregon Agricultural College at Corvallis. One of the finest technical staffs in horticulture and its branches of any college in the nation is guiding the Oregon fruit industry through its constantly increasing problems. Sometimes we feel that the growers fail to appreciate the vital importance of maintaining this corps of expert advisors and experimentors. As an illustration, we find that the fruit men are not vigilant enough in requesting state aid through the Legislature to the Experiment Station. This society should take a strong stand before the Legislature in demanding proper appropriations to maintain our agricultural college at its maximum efficiency. I wish to give Mr. Chas. Parke and the other members of the legislative committee of the society credit for their efforts before the last session of the Legislature.

In recording the progress being made in horticulture in Oregon during the past year attention should be called to the shipments of boxed apples being made to Europe direct from Portland in refrigerator steamers. This means much to the fruit industry as it in a way releases it from the dangers of car shortage and high freight rates on the railroad lines.

Another advance inaugurated in a large way has been the shipment of fresh fruits, berries, cherries and the like to Eastern markets. We lack proper pre-cooling facilities and sufficient cold storage space in the western part of the state, however.

Despite the depressing conditions of the times the year has not been without its progress in the horticultural field.

REPORT OF SECRETARY

By C. D. Minton

We are at the close of another year which has marked another very erratic one for the horticulturist. The sudden deflation of our values wrought such havoc with purchasers of horticultural products that it seemed that at the beginning of the year there would be no demand for their product and even if there was a demand no financial assistance to help market it. However the brave horticulturist went ahead with his planning upon the basis that there would develop a market and if there should not be one there would be a way to save it until his market arrived.

To this end perhaps a larger amount of fruits and berries were marketed for fresh consumption this year than in many years previous as the prices had fallen to where the masses could purchase them.

Labor to a considerable extent had been reduced and production costs were not as large as in years previous and demand started to increase so that withal the horticulturist has had a moderately profitable year.

As a rule the average man who is engaged in horticultural production spends no money for advertising. This year, however, he has been a splendid advertiser, although unwillingly, by having his products placed before the consuming public at a price which could be reached by the great masses of the consuming public, hence hog and hominy has given way to the finer fruits and vegetables. This will create a demand, will insure future markets, provided that prices are kept at a level which are remunerative to the grower and within reach of the consumer.

I have felt for some time that our society has not given as much recognition to some horticulturists who have been of great benefit to the industry in general, and that just recognition should be given to some of those who have worked incessantly for the industry, and have accomplished much by their efforts, by making them honorary members of this body.

We are saddened as we gather here today by the fact that two of our charter members have passed away since our last meeting one year ago—Hon. C. L. Smith, of Hood River, and Hon. H. B. Miller, of Portland. The latter only two days ago and is being laid to rest today while we are here in this meeting. These were two of our only three remaining charter members of this society who builded even better than they knew or ever dreamed.

Our legislative committee did excellent work at the last meeting of the State Legislature. Laws which were recommended at our last meeting were enacted and assistance was given in defeating some proposed laws which were inimicable to the interests of the horticulturists.

Our financial interests are in good condition and a detailed statement will be forwarded each member in our annual report. Our prospects are beyond; there is no looking backward only in retrospect. New fruits are being introduced, new diseases must be combatted, new conditions are arising; therefore our motto must be, "Looking forward, ever striving to lead or keep pace."

President Pearcy: There is a suggestion in Mr. Minton's report that should have action taken upon it—namely, the matter of increasing our honorary list. There are a number of men—leaders—in this line of work, whose names should be but are not now on our lists. Is there a motion on this matter?

Member: I make a motion that a committee be appointed to take up the matter of increasing the honorary membership in the Oregon State Horticultural Society.

Motion carried.

President Pearcy: I appoint on this committee, C. D. Minton, Prof. H. P. Barss, Ferd Groner and John Forbis.

Prof. Barss: I suggest that at this time some explanation about membership in this society should be made and invitation extended to any who might be desirous of becoming a member of the Horticultural Society.

President Pearcy: The aim of the Oregon State Horticultural Society is to promote horticulture in all its aspects and to better the industry. The state recognizes the organization, placing it second to the State Board of Horticulture. We receive some aid from the state. Our dues are one dollar a year. Payment of ten dollars entitles a person to full life membership. Mr. Minton, the secretary of the organization, will be glad to enroll any one who would like to become a member of the Horticultural Society.

FINANCIAL STATEMENT OF THE OREGON HORTICULTURAL SOCIETY, YEAR ENDING DECEMBER 31, 1921

IRREDUCIBLE FUND

Lambert Fund	$ 100.00	
Hoskins Fund	2000.00	
Cardwell Fund	168.50	
Oregon Apple Growers Fund	40.00	
Life Memberships	645.00	$2953.50
Invested as follows:		
U. S. Liberty Loan Bonds 4¼%	$2500.00	
U. S. Liberty Loan Bonds 4½%	350.00	
Ladd & Tilton Bank	103.50	$2953.50
Irreducible Fund Receipts:		
Life Memberships	$ 10.00	$ 10.00
General Fund Receipts:		
Balance on hand last report	$1039.13	
Interest on Bonds	119.97	
Annual dues	53.00	$1212.10
		$1212.10
Disbursements:		
J. L. Hartman Co., Bond	$ 7.50	
Brownsville Canning Co. Telephone	2.95	
Wash. Co. News, Printing	7.50	
Earl Pearcy Adv.	5.00	
Irwin Hodson Badges	22.75	
H. C. Browne, Printing	40.00	
Clark Bros., Flowers	7.00	
Staples, Jeweler	18.00	
C. D. Minton, Sundry expense as itemized	21.75	$ 132.45
Balance		$1089.65

TRIAL BALANCE

Cash on hand	$1089.65	
Loss and Gain		$1099.00
Lambert Fund		100.00
Hoskins Fund		2000.00
Cardwell Fund		168.50
Life Memberships		645.00
Oregon Apple Growers Fund		40.00
Government Bonds	2850.00	
Supplies	9.35	
Due Irreducible Fund from General Fund	103.50	
	$4052.50	$4052.50

We, your committee duly appointed to audit the books and accounts of Mr. C. D. Minton, the Secretary-Treasurer of the Oregon State Horticultural Society, hereby certify that we have this day examined all books and records submitted to us and find the same in order in every respect covering the year ending December 31, 1921.

We also certify that the cash on hand, as shown by the Trial Balance is on deposit with the Ladd & Tilton bank, and we have had exhibited to us U. S. Liberty bonds to the aggregate sum of $2850.00.

Dated Portland, Oregon, April 17, 1922.

E. A. BURT,
J. B. PILKINGTON,
Committee.

President Pearcy: The next number on the program was to have been a paper on "Modern Practices in Gardening as I Saw Them in the Middle West and East," by Elmo Chase, of Chase & Sons, Eugene, Oregon. He has not as yet arrived—probably due to poor weather and some difficulties in railroad transportation. At this time, I should like to call on Prof. A. G. B. Bouquet, of Oregon Agricultural College, to speak to us. Prof. Bouquet is an expert on vegetable horticulture.

Prof. Bouquet: I feel that I am possibly putting myself forward unwittingly if I speak a few words at this time. I had hoped that people could appear to give their addresses at the proper time.

I am particularly interested in the vegetable side of the Horticultural Society. However, I am glad to be a member of the Horticultural Society. I remember the meetings of the Horticultural Society long ago. They used to be held in Portland in connection with the Fruit Growers' Association meetings and fruit show. This meeting of the fruit organization in connection with the Horticultural Society was a great incentive to members of both organizations to attend. Horticulturists were allowed to come to the Fruit Growers' meetings to see the fruit displays. There were displays from Hood River, Southern Oregon, Willamette Valley and many other parts of Oregon. In those days there were large numbers of people in attendance and I only wish that we had as large crowds at our meetings now as we used to in the old days. We miss the splendid meetings and the fine men. But the Horticultural Society is always struggling to go forward.

We have tried to interest other horticulturists besides the fruit growers. Horticulture is not only the berry and the pear. Only in the last few years have people become interested in other lines of horticulture. Oregon is a great nut country and in recent years much has been made of this phase of work. The magnitude of the vegetable growers' industry is indeed remarkable. But there is nothing to draw the vegetable growers together. How can we interest them in the papers and reports of the Horticultural Society? To partially remedy this difficulty or weakness, four or five years ago, we were allowed to put on a vegetable section on the program of the Oregon State Horticultural Society meeting. There are a number of districts in Oregon in which a great deal of vegetable growing is done. There is Hood River, for example, which does a large business in asparagus growing. But Hood River vegetable growers are not very much interested in this organization. We have tried to attract vegetable growers to this organization and get them interested in joining the Horticultural Society and paying the one dollar dues. At our meeting here at Forest Grove, we shall have a half day given over to our side of the subject. The onion industry in Washington County amounts to a quarter of a million dollars. We have problems affecting the onion industry, but without discussion of them, onion industry will not go forward. Since we are meeting in this district, we will aim to discuss this matter quite fully. The broccoli industry in Southern Oregon is worth two hundred thousand dollars. There will be discussion on that subject, too. I feel as though I ought to make an apology to the fruit growers for taking a half day for discussion of the experiences, results and problems of the vegetable growers. However, I believe we are broad-minded enough to give other horticulturists a chance. The Horticultural Society does not stand for one thing alone.

I am an Englishman and I like to look back to the meetings of the Royal Horticultural Society of England. I wish that we had a society in Oregon equal to the Royal Society of Horticulture in England. I think we might apply some of the lessons or methods of the Royal Horticultural Society of England to our own society. The Royal Society has branches throughout all England. We can look forward five or ten years and see branches of our Oregon State Horticultural Society. Then horticulturists will not have to travel fifty or more miles to a meeting. Some years ago our annual meeting was held at Hood River. Hood River delegates and the old stand-bys were present. It was practically a local or district meeting. The Royal Society also has competitive displays and discussions of every paper, as other features of their work. If we cannot make the bodies more representative and have larger attendance at our meetings, how are we going to meet our difficulties and problems? This is a problem. What are we going to do about it? The Royal Horticultural Society of England has a powerful body of hundreds of thousands of men who stand by their organization. The district organization does on a small scale what the Royal Society does on a large scale. What attractions does our Horticultural Society offer to the broccoli, celery and other similar businesses? Will men travel miles to hear a paper that they can read in a written-report? I am not pessimistic enough to think that we cannot get them here, but is it possible to do it—I mean to have branches or district associations and yet make men feel that they are a part of the State Horticultural Society? I want, during this meeting, some discussion of how we can interest and attract growers of horticultural products who do not belong to the Oregon State Horticultural Society. Recently I had a letter from some horticulturists in the state of Missouri. They have been thinking of forming a state vegetable growers' association. They have a well-organized farm bureau. In this new organization which they wish to form, they do not want to buy or sell and would like to know what would be the functions of such an association. Would it be educational or social functions? Would such an organization be a success and worth while, etc., etc.? There are several functions for a state vegetable growers' association. First, such an organization would have to give a solid backing to all vegetable growers of the state. Any vegetable grower would be benefited by paying his dues of one dollar, if only to the extent of having the solid backing of the organization. Moreover, such a large and strong body would be powerful enough to present matters pertaining to its problems, to the State Legislature for help and settlement.

President Pearcy: Is there any question or discussion on this subject before we continue with the program?

Mr. Forbis: I have heard with a great deal of interest Professor Bouquet's discussion of vegetable growers' troubles. I have been particularly interested in his remarks concerning the way in which England handles her problems. Our conditions are bad. We may not be interested. We are not solidified. We have no gardens in America. England has gardens handed down from father to son. We have the Japanese, the Chinese and the Italians with whom we are practically forced to compete. We cannot interest them in solidity. We cannot expect solidity in green people. We are not yet settled in our occupations and our businesses. Horticultural Societies can go on trying and trying, but it will take more than a generation to interest people. Not only in the vegetable side of the matter, but also in other phases of horticulture it is the same. We see the necessity for some sort of action but at present we cannot meet it. You cannot interest the ordinary man in gardening because he is not a gardener and thinks that sort of work is a mean little business and not for him. It is a deplorable thing but a fact we cannot escape. I am interested in gardening not commercially but because I like it—I like to understand how things grow, I like to get into the soil. Young men care only for the potato growth.

Sometimes it may be possible to have vice-presidents distributed throughout the state of Oregon, who shall have power to call meetings to discuss the problems of the particular business or industry of their section of the state. The time will come when we can do this. The men from Italy, Japan, etc., know more than we do about gardening in general and from long experience. But they would not understand what we say when we try to tell them of some new but tried experiment. New things are always coming up and even professional men have to come back and learn some things again. You can not find one in a thousand who is interested in gardens. If you do find him he has had experience and has not been to meetings to hear reports and papers. It will take far into the next generation to settle the problem.

President Pearcy: We ought to try to get the interest of the vegetable growers and get them to come to our meetings. Professor Bouquet asked for part of this program and we were indeed glad to give him some time for discussion of the problems of the vegetable growers. We hope sometime that it will be possible to have branch meetings of various horticulturists in different parts of the state.

Mr. Butner: I have been in Oregon for ten years. I have heard the superior air of the fruit grower over the market gardener. I believe we should interest the higher class of men who are gardening. Then they will come to the meetings. Naturally the Italians cannot come. They would not understand what we say. There are some market gardeners of a higher class.

Mr. Forbis: I do not mean that these people are of lower intelligence. They know far more than we do. But they do not understand the English language. Moreover, we cannot instruct them, because they know more about the business of gardening than we do. They are superior to us.

Mr. Butner: We have a higher standard of business, industry and living. We ought to give the American the preference but at the same time, attempt to raise the standard of the foreigner.

Prof. Bouquet: Our vegetable business is not made up of Asiatics and Italians. We have many white Americans who are gardening right here in Oregon. We do not appreciate the fact that there are hundreds of white people who are growing vegetables in Corvallis. Some of them can make their living growing celery better than growing fruit. Do not get the impression that there are so many foreigners.

President Pearcy: I see that Mr. Chase has arrived. At this time I shall call for the paper on "Modern Practices in Gardening as I Saw Them in the Middle West and East," by Elmo Chase, of Chase & Sons, Eugene, Oregon.

MODERN PRACTICES IN GARDENING AS I SAW THEM IN THE MIDDLE WEST AND EAST

By Elmo Chase, of Chase & Sons, Eugene, Oregon

Before taking up in detail the methods used in the production of vegetables in the Eastern States, I wish to sketch briefly the location, soil and the general type of gardening practiced in the important vegetable producing sections visited in our trip across the continent.

Through Southern Illinois, Indiana and Ohio we found some market gardening near the large cities but very little truck farming. The greenhouse ranges were very large and of modern steel construction. Many of the newer houses were 500-600 feet long and some as wide as 80 feet, containing in some cases an area greater than one acre. The advantages of this section as a greenhouse center are found in their nearness to the coal mines, their large markets, and excellent transportation. The soil in this section varies from heavy to medium in texture and the climatic conditions seem to be rather unfavorable for extensive outdoor gardening.

Reaching the Atlantic seaboard we found entirely different conditions existing. New Jersey stands out as a prominent factor in vegetable growing in this section. The climate is mild due to the influence of the ocean, while the soil is typical garden soil, being very sandy and easily worked. Their growing season is long and three or more crops are often produced each year. The southern part of the state is a famous trucking section and has the distinction of having the largest farm in the United States and probably the world. The Seabrook Farm as it is called has in cultivation over 3000 acres, over 1000 of which are devoted to vegetables and the balance is being planted to fruit. In the northern section of the state near New York City are found a great number of market gardeners who do an immense business in a very intensive way. They sell largely on the farmers wholesale street markets in Newark and New York which open soon after midnight and continue sometimes until noon but most of the business is done before 8 o'clock in the morning.

Through northern New York, Ohio, and Illinois is one gardening section after another, most of them along the Great Lakes or in the swamp areas where the muck land is found. Both the sandy soils along the Lakes and the muck soils in the lowlands are deficient in plant food and must be fertilized heavily to produce a good crop. The presence of the Lakes is responsible for the class of soil as well as the modified climate which makes possible this great gardening section. Nearness to market again completes the triangle of soil, climate and market, which is so essential to successful market gardening. Along Lake Erie from Buffalo to Toledo, Ohio, is probably the greatest greenhouse section in the world and the area under glass would run up to several hundred acres in all.

Under the head of garden practices we shall consider first the question of water supply.

I. Methods of Watering.—The overhead or spray system of irrigation—commonly called the Skinner System—is in almost universal use where artificial irrigation is needed. We did not observe any other method of watering, except in the muck sections, where sub-irrigation is practiced. The overhead system is used over large areas, twenty and thirty-acre tracts being common. In one case a 300-acre system was inspected on the Seabrook Farm, in New Jersey. The cost of installation of this system is high but the returns are great and it is almost indispensable in modern gardening practices. The system is admirably suited to a great variety of crops and can be used irrespective of the physical features of the land. The chief benefits derived from this system are: (1) Increase in the number of crops grown each year—two and three crops is the common practice in the place of one. (2) Increase the yield of each crop. (3) Improves the quality and appearance of the vegetables grown. Practically all the greenhouse ranges of any size are equipped with the overhead spray system and differ from the outside only in the nozzle used.

II. Fertilization.—Manure still remains the staple source of plant food in spite of its scarcity and high price. The general tendency seems to be to cut down the amount used and supplement it with a good commercial fertilizer such as rock phosphate or a complete fertilizer. Instead of using 50 tons of manure as many formerly did, the practice now is to use 25 tons or less and a liberal dressing of commercial fertilizer. On some small patches we found gardeners using as high as 100 tons to the acre but this is exceptional as manure at present prices cost them from $3 to $5 a ton throughout the East. Manure is indispensable in the greenhouse work because of the humus factor and very few growers are trying to do without it. Manure pits in connection with greenhouse ranges are very common and are used to furnish liquid manure for the growing crops. The large amount of money spent for fertilizers is an indication of their value to the grower. One New Jersey firm spent $4000 for manure and $3000 for commercial fertilizers last year for their 180-acre farm. The Seabrook Farm applies from 20 to 25 tons of manure to the acre each year. On the muck lands one grower was using 1¼ tons of 5½-8½-10 fertilizer with excellent results.

III. Seed Strains.—Surprising as it may seem and a backward step in the opinion of many is the increased production of seed for their own use by individual gardeners. Many of the best gardeners and greenhouse men feel that it is too big a chance to take to use the regular run of seed from the seedman. One lot of seed purchased may be very good while the next very poor, all from the same firm but often produced by different men. Thus many gardeners are growing their own seed for their important crops whenever possible. It is an acknowledged fact that the cost is seldom less and very often is more than the same amount of seed would cost if purchased from the seedman. The increased crop should amply repay any man for his trouble if the work of selection has been well done. Other growers told us they were getting around the trouble by purchasing enough seed for two or three years at one time and then testing the seed one year before planting in large amounts. Cucumber growers in the greenhouse save their own seed and most of them have developed their own strain. With tomatoes the selection of seed becomes more difficult and several large growers told us their strains had "run out" and they were forced to go back to the seedman for a new start.

IV. Intensive Crops.—There is no better illustration of the intensive method of food production than in the growing of leaf lettuce in the greenhouse. Many growers plant their entire house in lettuce not even leaving room for a path and by the time the crop is grown it is a solid block of green color, the ground showing in no place. Outside we found remarkable intensive work being done. Two and three crops often grown on the same land each year. One rotation used was an early crop of head lettuce, followed by a celery crop and a carrot crop to complete the year. One man has said that vegetable gardening is the most intensive form of agriculture in the world and is crop production raised to the "N" degree. We can readily believe this when we see the immense quantities of produce taken from the land each year. Such yields as 20 tons of cabbage or 45 tons of table carrots to the acre make one wonder where they all come from. Greenhouse tomatoes often produce at the rate of 35-40 tons of fruit to the acre. Greenhouse men in the Middle West told us that a gross return of $15,000 an acre for ground under glass would be an average return. This illustrates the possibilities of this class of farming as a food supplier for future generations.

Prof. Bouquet: I wish Mr. Chase would tell us about how he received the cuckoo clock as a prize.

Mr. Chase: We started our experiment last spring on a half acre of land, and planted celery. When it was time for the National Convention of Vegetable Growers at Albany, New York, we sent our celery, well wrapped, via open express. It looked rather poor by the time it reached the East—somewhat withered, etc. Some of the stalks were rotting and on the whole we were pretty much discouraged. However, our celery was the largest specimen back there. The judges gave us second place and we won the cuckoo clock. There may have been some doubt in the judges' minds as to the real quality of the stalks in the beginning. The first place went to a New York firm. Their product was grown in fine muck soil and they had a fine crop. We had a dry season and our crop was not quite so large. They brought theirs into town the night before and ours had to be shipped away across the continent. Nevertheless, we were well repaid for our effort.

President Pearcy: I want to make an announcement to the effect that the Forest Grove Commercial Club is going to give an informal reception to the Oregon State Horticultural Society here in this room tomorrow, Friday, evening. There will be a short program. Everybody is invited to come. Another thing—there are some boys here from the agricultural class of the Forest Grove High School. We are very glad to have them here and we should like to have them come up front here to Mr. Minton's desk and get badges. They won't cost you anything, boys. Come on.

Mr. Groner (President of the Oregon Nut Society): I have been listening to the talks with interest. Also, I have been thinking how associations might be worth more to growers. No doubt complete co-operation among growers would be better. It seems as though each fellow has his own idea, which is all right, but we have no concentrated idea of any direct object that we are trying to give.

I am more versed in nuts. In our line we should do this. Find one variety that we think better than another, concentrate along that line, build that up, grade it to a point that will bring the greatest results to the growers when it is put on the market. The principal thing is—how much money is he going to get? Outside of that, we are not so interested. Grading is all right. Nuts are graded fancy, fine and fairly good. The bottom grade is salable. That grade brought 3 cents lower than the first grade. Is it a good plan to grade that way or not? It might be that the public could be educated to such a standard that they would pay higher prices for that top grade, but unless it can be done, it is not an advisable thing to do. Possibly we can do that. We wish so. Take the general lines of vegetables for instance. There are approximately 40 tons of carrots per acre. People should be taught to eat carrots instead of meat. As it is, carrots are raised and fed to hogs. Also, people should be educated to eat nuts. Last fall there were no nuts left. One good reason for eating nuts is from the health standpoint alone. The dairyman is weak because he has permitted other people to take a large per cent of his business. If you are not honestly interested in your line, then do not stay in it. If you do not think your line is best, you will not succeed.

Mr. C. A. Tonnison, of Tacoma, Washington (Secretary of Northwest Nursery Association): In the state of Washington, gardening is largely carried on by the Japanese. It is almost entirely under their control. The Japanese undermine the whites from a producing and selling standpoint. But the whites can win out. They take more prizes than the Japanese. The Japs will work for lower wages for the Japs than they will for the whites. That is why the whites are undermined. The Japanese work 16 hours a day—from daylight to dark—and the whole family works—father, mother and children of almost all ages. I agree with Mr. Groner that persistence and high ideals are the things which will make the whites win out.

Washington is ahead of all states in the nation in apple growing. Twenty-five million boxes of apples was the total crop for last year. Oregon, Idaho and Washington together raise over half of the apples of the United States, 75 per cent of the prunes and 30 to 40 per cent of the cherries. Orcharding in Eastern United States is rapidly decreasing.

Just a word of warning—be careful not to plunge into things. For example, the prune business is sometimes very discouraging. Some people try to put out a larger acreage than they can manage. Figure on the average. Stay within the average amount of acreage and produce high quality. At present, nurserymen are trying to standardize their products. They are trying to keep to high ideals. They are making a great effort to keep the unsatisfactory products out of the market. Such a plan is better not only for the nurserymen but also for the fruit grower. Stay by some average. Do not get discouraged. For instance—I have known a man in Washington for the last 10 years. For several years his crop did not do well and markets were poor. He became discouraged and quit the business. If he had stayed by it, he could have paid for all his debts which he had incurred in buying equipment, cultivating, etc., in just last year's production.

Mr. Chase: On our trip through the Middle West and East, we found everything in the hands of the Italians and other foreigners. No gardens were run by Italians but by Americans. It was American management and Italian work. The foreigner can live and work for less than the white man. Moreover, no Japanese has put his produce on the market for less than the white man can.

President Pearcy: It is time to close our meeting for this morning. If there are any who have not paid their dollar, we should be glad to have them see Mr. Minton immediately at the close of this session. The meeting is adjourned until 1:30 P. M.

THURSDAY AFTERNOON

The meeting was called to order by Prof. A. G. B. Bouquet.

Prof. Bouquet: There is a good deal of onion growing in Washington County. Some of the onion growers are having trouble with the maggot and the smut and it is concerning these that we are going to have a little discussion this afternoon. We are going to re-arrange our program somewhat, on account of a meeting that is being held at Hillsboro and to which a number of our members want to go. Considerable demonstration work has been done on the onion smut but not a great deal on the onion maggot. They are nearly the same but the smut comes first, not because it is less important but because not so much demonstration work has been done on this matter. Prof. H. P. Barss, of the Oregon Agricultural College, will speak to us on "Onion Smut Control."

Prof. Bouquet: There is an important pest which affects this crop concerning which many growers have had trouble. This has had more attention given to it than the smut. It is the maggot. Recently I ate luncheon with a man who had lost his onions from the maggot. The onion growers in Washington and Marion counties know the danger of the maggot. The next number on the program is "The Onion Maggot" by Prof. A. L. Lovett.

THE ONION MAGGOT

The Use of Cull Onions in Control

By A. L. Lovett, Entomologist, O. A. C. Experiment Station

The two insect pests of major importance in commercial onion production are the onion thrips and the onion maggot. Improved cultural practices will do much to lessen serious thrips injury, but certainly for the onion maggot some more direct and rigorous practices seem imperative.

Because of the pressure of other problems and the limited funds and men available, no careful study of this pest has been undertaken in Oregon. Nevertheless the general evidence available would indicate that the onion maggot is increasing in importance and destructiveness with the years and increased acreage devoted to onion plantings. Probably the past season marked the climax in destructiveness for the insect in our Oregon plantings.

The climatic factor undoubtedly plays an important part in the prevalence and injury by this general group of insect pests, known as Diptera or two winged flies. Comparative evidence is available regarding the presence of, slight injury by, or maximum destructiveness of certain allied economic forms of this group, depending on the amount of precipitation occurring in the particular district. That the unusually early rains in the fall of 1920 and the excessively late rains of the past spring were an important factor in accounting for the unusual prevalence and injury by the onion maggot is acknowledged by all who have studied the subject.

Life History and Habits

The onion maggot is of European origin. It has been seriously injurious in the eastern United States since the late 80's and had developed in such proportions in Wisconsin by 1915 as to force many commercial growers to give up the business of growing onions.

The winter is passed principally as puparia in the soil. These puparia occur as little brown capsule-like cases about one-fifth inch in length. It is within this case that the transformation from maggot to adult fly takes place.

The adult flies emerge in the spring just as onions are starting well. They deposit the white, elongate oval eggs, about one-twenty-fifth inch in length at the base of the leaf sheath, on the side of the stem near the ground or in cracks and crevices or under clods adjacent to the onion stem. These eggs hatch in 3 to 10 days (depending on temperature) and the young maggot tunnels its way within. Very young plants may be killed outright, in older plants the maggots enter the bulb and decay sets in. Several maggots may occur in a single bulb.

The maggot becomes mature in two to five weeks. Development is generally more rapid in green onions and somewhat delayed in seed onions. The mature maggot generally leaves the onion, though not always, transforming to this puparium or brown case in the surrounding soil. This pupal stage requires about two weeks, when a new brood of the flies emerge to repeat the cycle. There are probably two fairly complete generations of the fly under our conditions.

Control

Because of the serious injury by the onion maggot, it has been the subject of no little study in the east and various tests and recommendations in control have been made. Traps, soil treatments and other devices have been tried but have not proven practical.

More recently Severine, working in Wisconsin, developed the sweetened poison bait treatment. This appeared the most promising of all the known remedies and was widely heralded and generally recommended. This treatment consists of an attractive molasses and water bait, treated with sodium arsenate. Various methods of application have been recommended, probably the most generally employed is to sprinkle the bait in fine droplets over the fields and adjacent vegetation by means of a whisk broom dipped in the solution and flipped quickly over the plants.

Unfortunately in practice, this treatment did not give a degree of control that was satisfactory in all cases. Undoubtedly the failure in some instances to keep the baits attractive accounts for the poor results.

British Columbia investigators undertook a careful study of the onion maggot and its control in 1918-19. Certain improvements in the attractiveness of the bait were affected and some points regarding the limits of its use were developed.

The Volunteer Onion in Control

The most striking feature developed, however, was the discovery that the first brood of adult flies were strongly attracted to and oviposited by far the majority of their eggs on or near volunteer onions. Taking advantage of this point in 1920 elaborate tests were made in commercial plantings in the use of volunteer and cull onions as a lure for the adult flies of the first generation. The results are so striking, as I had opportunity to observe them in B. C. in 1920, and as we have had opportunity to demonstrate them in small plantings in Oregon, that we feel the practice is thoroughly practical. Results thus far have been so satisfactory and the injury lessened so much more than by any other treatment, our growers can ill afford not to adopt the practice at least on a portion of their plantings.

How to Apply

Cull onions showing a sprangly or bushy top growth should be selected. These are planted, one about every 100 feet in the onion rows. Thinning should be delayed about 10 days to two weeks later than normal. One week previous to thinning, remove the cull onions and accumulation of maggots. At thinning time pay particular attention to maggot infested onions and remove these, taking care likewise that they be destroyed. Where this practice in the elimination of the early generation of maggots is given careful attention, later infestations are almost negligible. Figures from the 1921 results in British Columbia are not available but the increased tonnage in 1920 was such as to leave no doubt as to the efficacy of the treatment.

Prof. Barss: Will maggots develop in cull onion piles?

Prof. Lovett: Not that I know of. The fly which develops there is a low type of fly and not the onion maggot.

Member: Is this the same maggot that affects kale?

Prof. Lovett: We have a number of different types of maggot—those which affect kale, seed corn, cabbage, radish, turnips, etc.,—but these do not attack the onion. The onion maggot is the only one in the onion. It will not breed in a rotting pile of cull onions.

Member: What will become of maggot that is in the grown onion now—the onion that is in the sack. There is a brown spot in the onion now. This will become damp. There are several maggots in the onions. What becomes of these maggots?

Prof. Lovett: If it is a real onion maggot, it will mature in the onion and pupate there in the sack. The average flight of these flies is one quarter of a mile. If any maggot pupated in a sack not far from an onion field, they would fly back to the field, if it is not more than a quarter of a mile away.

Member: How do you account for Mr. Fannow's onions being attacked? He keeps his ground flooded during the winter.

Prof. Lovett: I have no ways of saying positively. I believe that would have but little ill effect on the transformation stage of the fly. It can probably stand flooding or even freezing in this stage. Water will not kill them if his fields were flooded for ninety days. Most insects can stand water and freezing.

Member: Have sprays or disinfectant powders been effective?

Prof. Lovett: Water is valuable for use while they are in the field. The first commercial process treatment should be made every day or so. In the average case we do not get a high degree of killed flies because they do not get the treatment. There is no comparison of the two tests of treating onions.

Prof. Bouquet: Is Mr. John Rice in the room? Mr. Leedy is now here. He was to have led in this discussion. At this time Mr. J. C. Leedy of Beaverton, will speak to us.

Mr. Leedy: Mr. Chairman, members of the State Horticultural Society. We are greatly interested in these problems discussed here today. I don't know which is more important. Probably more have been hit by the maggot than the smut. The maggot is very generally distributed throughout Washington county. No one entirely escapes it. Mr. Fannow got the worst of it. He had seventeen acres and two and a half acres were absolutely ruined by the maggot. The maggot does not take the crop clean. It cuts down the yield and thins it out. At my place, the maggot took it in some patches, here and there. I noticed that the maggot worked in the wetter portion of the field. Is there any relation between drainage and the control of the maggot? That is a matter to be investigated. If the wet season favors them, we will expect them to work in the damp places. Some portions of my place are not sufficiently drained. It is hard to drain them. I believe that there is a close relation between the maggot work and draining. Where there is too much mositure, the maggot seems to work. I cannot estimate the damage because we have no way of knowing. Judging from the size of areas, on an eleven acre patch, the crop was reduced five hundred sacks. Some growers are hit a great deal more than I. Mr. Johnson of Milwaukie had a crop of onions, the yield of which was reduced two thirds. Where the maggot takes the onions in patches, it is due to the damp places. If we figure the loss in money values, then we can see that the damage runs up into the thousands.

This is to be a testimony meeting. We should tell of our experiences and troubles. Prof. Lovett has spoken to us from the scientific standpoint. Our experiences will give us some conclusions. I tried the volunteer method of planting onions to get rid of the maggot. I did this according to Prof. Lovett's suggestion. Where the land is not flooded, the onion volunteers. There are plenty of eggs around the volunteer onions. The ones I pulled were literally full of maggots. I believe I left them in the ground too long. I would like to put on a demonstration. I wish some of the others would tell of their experiences.

Prof. Bouquet: This brother is satisfied. Who else wants to testify?

Mr. Cling: Mr. Johnson ploughed his field, I thought, on back furrow. I thought this was the worst way, in dry, loose ground. The maggot destroys in patches. I think poison makes the maggot fat. I have thought that by ploughing very deep—say about a foot—one could bury the maggot so that it could not work for the depth of earth above it and the onion could get a head start. However, I have found nothing to control the maggot. I have also tried a mixture which I believe Mr. Rice made. It is composed of paris green, bran and molasses—the same mixture as is used for the cut worm. There were only thirty-five sacks of onions from one acre.

Prof. Lovett: Try the poison bait proposition, i. e., water, sodium arsenic, and molasses. Put it on early. Get the adult flies before the eggs are deposited in the spring. There is no object in having molasses. The mixed poison bait is for the cut worm.

Member: If you sprinkle water on the land and then soon it rains, the rain will spoil the effect.

Prof. Lovett: Yes, the rain spoils the effect.

Prof. Bouquet: Does anybody else wish to say anything on the subject? Please do not leave the room unless you have something very important to do.

Member: Can you get sodium arsenic at drug stores?

Prof. Lovett: Yes, you can get the sodium arsenic at drug stores, but it is safer to see the druggist early so he can get the sodium arsenic from the wholesale house if he does not have it in stock himself.

Member: I cannot find it and neither can the druggist.

Prof. Lovett: In the absence of sodium arsenic, use white arsenic. Every dose of white arsenic gradually lessens the flies' interest in life. The more quickly acting poison is not so necessary.

Prof. Bouquet: It is very evident that there is progress being made in the control of the onion maggot. Everything is beginning a slow progress of control. The onion growers should be congratulated for the attention given on their subject.

Prof. Bouquet: Here are some more men from the agricultural class of the Forest Grove high school. They will be future members of the Oregon State Horticultural Society. Just step this way boys, and we will give you a badge. It will not cost you a dollar. We want you to have these to wear.

Prof. Bouquet: Is there anyone yet who wishes to give vent to his feeling as to the onion maggot or the smut? We want to have it before the next subject. Let us hear from you if you have it on your mind. Some onion-growers have not mentioned it.

Member: As head of the Farm Growers' Bureau, I would like to invite the onion growers to come to a meeting at Hillsboro, December 29, and discuss their experiences and form new plans for continuing the experimental work. Prof. Lovett wants a demonstration put on in this county.

Prof. Bouquet: In the last few years there has been particular progress made along the line of breeding. Only in the last three years have we had the three hundred egg hen. Just recently we have seen some wonderful stock. We want to know what the vegetable grower is doing in the line of progress in breeding. We have as our next speaker someone who has done a great deal in the line of seed breeding. His firm has bred a certain kind of sweet corn. We can say we have a man who has done something to forward horticultural interests in Oregon—Mr. Gill.

THE RELATION OF SEED STRAINS TO THE YIELD AND QUALITY OF THE VEGETABLE

By Ray W. Gill, of Gill Bros. Seed Co., Portland, Ore.

(Note) The reference made in this article to the Agricultural Colleges and county agents are not intended as criticism or reflecttions but are made only with a sincere desire to better the conditions mentioned. I am not unfriendly to either the Agricultural College or County Agent.

Probably one of the greatest marvels in horticulture is the wonderful individuality of the seed. People often refer to miracles of Biblical times, but we have on every hand today the miracle of the seed. For example we have the tiny cabbage seed not much larger than the head of a pin, which is capable of producing a head of cabbage weighing twenty pounds, or we have the minute tobacco seed hardly discernable to the naked eye, which is capable of producing a plant 8 or 10 feet high with leaves often 3 feet long and 1½ feet in width. At variance with these two plants, we have the bean, which has quite a large heavy seed and produces a small sized plant. More miraculous than this propensity for reaching great size is the fact that locked up in this seed is the key to quality, color, vitality and uniformity.

The commercial grower of vegetables is therefor vitally interested in the seed he plants for this is the foundation of his work and failure with the seed means wasted effort and usually partial failure and often total loss. The problem before the market gardener today is to eliminate this chance of loss through inferior seeds. He is confronted by the fact that the average of seeds sold today are only about 40 to 50% efficient. Let me make that statement more clear. You are all familiar with the rapid development that is taking place with livestock, as many of you witnessed at the Pacific International Livestock Show in Portland recently. We find poultrymen and dairymen everywhere culling out the unproductive individuals of their flock or herd. We find fabulous prices being paid for purebred breeding stock. The term purebred livestock is well understood among livestock men, even the layman appreciates the progress made. On the other hand how few there are who know there is such a thing as purebred seed, and much less demand it from their merchant. When I state that the seeds of today are only 40 to 50% efficient I mean that the improvements in purebred seeds have proceeded so slowly that on an average basis the seed men today are only offering market gardeners seeds that are 40 to 50% efficient compared with conditions which could prevail if purebred seed production had reached the standard our present conditions demand The market gardener today operates against a high level of costs; land values, labor, machinery and fertilizers are all above normal, while the sale value of crops he produces are normal and in many cases below normal. He must therefore use every honorable method available to offset the disparity against him. As one means of doing this he should give more careful attention to the purchase of his seed and should demand the best, not the cheapest seed. Just as long as there is a demand for cheap seed it will be forthcoming. For a farmer to ask for cheap seed is an open announcement that he is a second rate farmer.

Notwithstanding this there are thousands today who are submitting their lists of seed requirements to the lowest bidder and unfortunately our laws make the state of Oregon, also the United States government seed purchasers on this basis, thus setting a poor example for their constituents. Cheap seed is a big hindrance to the development of the seed industry into the high position it should command.

To illustrate the fallacy of cheap seed I submit the following comparison on a cabbage crop. It requires about ¼ pound of cabbage seed per acre. Cheap seed can be purchased at 75c while ¼ pound of high grade seed would cost around $2.75. This makes a difference in cost of $2.00. The poor grade seed will produce, if the grower is fortunate, around 4 to 5 tons per acre where the high grade seed would produce 9 to 10 tons. The difference in tonnage is not all, for the quality and commercial appearance will fall far short in the cheap seed. Therefore figuring the value of the crop at $20 per ton there is a net loss on the poor seed of $98 per acre, traceable to the seed alone. The loss of this $98 would eliminate any chance for profit above the expense of the crop.

To fix the responsibility for this alarming condition in the seed business above mentioned would be rather difficult. The tendency is for the grower to place the blame on the seedman. This is largely wrong, for the average seedman is selling according to the demand and is adjusting his prices as much as possible to meet the public expression.

The demand for high grade seed must originate from the gardener and must not be hampered with price restrictions. There is no question but what our present conditions with regard to seed are the direct result of price competition.

One seed store doing a low price, low grade seed business will discourage nine other stores from reaching out after the best quality. Seedmen cannot change this condition but the growers must.

There must be developed a closer co-operation between the seedman and the farmer, expressing itself on part of the farmer by complaint or praise regarding his seed purchases, also by turning over by farmer of the full business of seed growing to seed experts.

Our firm has had considerable experience in developing selected strains of seed. We have been discouraged as follows, first, by price bidding, second, by the farmer who writes us as follows, "Your Improved Golden Bantam corn is the finest I ever had. I saved it all for seed!" After our work of 10 years in developing this seed along specific lines this farmer thinks he knows more about the job than we do.

Propaganda has been spread by the government and the state, through the Agricultural College and the county agent urging the farmer to grow his own seed. I speak with experience when I say that only one farmer out of a hundred ever has any success in seed growing. I propose to show, not from selfish interest, but for the general good, that this idea is wrong and mistaken and that seed growing is the business of experts who have the training, experience and equipment at their disposal and who year after year, with unending patience, continue to develop and improve the seed until it reaches its rightful place and is maintained on such a plane that it can truly be called "pedigreed seed."

Germination, acclimation, varieties, strains, hybridizing, stock seed and reversions or rogues are all pertinent to the subject of seed and will be discussed in order.

Germination

This is a term used in preferring to the ability of a seed to sprout and transform itself into plant life. It has only been a few years since seed was sold without much effort in informing the public regarding the vitality or seed life, but today practically all seed houses have careful tests made to ascertain the percentage of live seeds. Most of these tests are made by placing the seed in a damp cotton and placing them in artificial heat. The test is usually made by testing one hundred seeds and the amount of live seeds indicates the percentage. In a general way this test indicates the vitality of the seed, but it is not entirely conclusive, for at a certain age seed may have vitality enough to sprout but is so weak that it does not make satisfactory growth when planted in the soil. The most accurate trial is a soil test made in greenhouses. I recall one instance where cabbage seed which was several years old gave a test of 75% under the artificial test but did not germinate over 25% when planted in the soil. There are several things which may affect germination, among which are dampness, excessive heat, immaturity and over ripeness. When seed are subject to excessive heat, the oil in the kernel is liberated and the seeds fail to grow. The conditions and localities under which seed grow, the manner in which they are cured and stored all have a direct bearing upon the life of seed. For instance, I have known onion seed to germinate only 50% the second year, while another lot of the same age germinated 85%. This illustrates the importance of making annual tests of all seed. Proper germination tests are the only fair way of determining germination. Often times seed of the best germination test fails to grow where planted too deep or too shallow, or when weather conditions are not favorable. A great many states now provide by law stated minimum tests at which seed can be sold. These are called standard tests and are in general use, especially with reference to field seeds. Seeds may be sold below these tests only where germination is marked with the actual test. It is a remarkable fact that the further we develop vegetable seed strains away from the wild state the less vitality we have in the seed.

Acclimation

Acclimation of seeds has very much to do with getting a full stand and successful crop. There seems to be a lack of adaptability when seeds are taken from the place in which they grow to a distant location, this is especially noticable where the climate conditions are extremely different, although this is not always the case. It is very important to plant northern grown seed in northern latitudes. However, we usually find that northern seeds are very successful in southern localities, but generally speaking, southern seeds should be eliminated as much as possible from northern districts. Acclimation of seeds is more important to certain vegetables than others, and among those which show the most marked effect are sweet corn, beans, peas, squash and pumpkin. As a general rule Oregon grown acclimated sweet corn will produce from 50 to 100% larger crops than eastern grown seed of the same variety planted in the same soil at the same date. If good acclimated seed can be procured, it should always be given the preference, not alone from a standpoint of vitality, but due to the fact that certain particular strains are found more adaptable in certain climatic conditions. This is further explained under the heading of "strains of seeds."

Varieties

We are gradually getting past that time when people walked into the seed store and bought a package of corn, peas, carrots, etc., and we now ask for some particular variety. Varieties mean, especially to the grower, the key to production, and to the commercial buyer of farm products, they are the key to quality. Today neither the grower nor the buyer place enough stress upon the variety for we find a great many farmers still growing crops who do not know what variety they are using, and we find many buyers simply buying onions, carrots, cabbage, etc., without asking "what is the variety." In a general sense quality, production, time of maturity, keeping qualities and appearance are all dependent upon the kind or variety used. It is very important then that the grower and the buyer both make careful tests to ascertain the best variety for their particular purpose, but each should bear in mind that quality is the all important thing, for the distribution of that kind which has the "better taste" is the variety that will command trade and increase consumption. In the commercial development of agriculture we find a very old variety, the Bartlett pear, the main pear in commercial use, and the same is true in regard to carrots, where we find the old Chantenay variety still the most popular. On the other hand we find many newer varieties coming to the front and being generally adopted, such as the Burpee Stringless Green Pod bean, Laxtonian peas, Improved Golden Bantam sweet corn, etc.

Strains of Seed

In simplified language we might say strains are simply subdivisions of varieties. Unless a person be intensely interested in agricultural growth or has a definite knowledge of seed growing he is not apt to be familiar with the use of this term and to illustrate, 99 out of 100 people might inspect a field of cabbage and while a great many might recognize the variety, to practically all of these people it would simply be a field of cabbage. Even if they were growers who were familiar with the variety, to them it would simply mean a field of Bald Head, Flat Dutch or whatever variety it happened to be, but, if their attention were called to it, these people might realize that within this one variety there would be several different types or strains, which, although they had a general habit of growth, would be radically different from each other. Enterprising and thoughtful growers and seed men see in these various strains, opportunities for selection to make great improvements in color, shape, flavor, yield and time of maturity. Again it may be found that certain plants are better adapted to the particular soil or climatic conditions. By isolating the particular plant or type which they wish to produce and saving the seed, they will commence the building of a new type. There is an old adage about "like producing like," which is the basis of this work, although we find that the ancestors of these plants have a great influence upon them, and none of these types can be fixed by one years' selection. The first seed saved will produce from 30 to 50% of plants very similar to the parent plant, but it will take usually from 3 to 5 crops of seed to fix this type so it can be relied upon to produce a uniform crop year after year. This kind of work takes patience, experience and knowledge, but those who are able and willing to do this work are usually repaid financially and at the same time they render a great service to humanity. It is through this kind of work that our fruits and vegetables are being improved in quality, size and production. We hear a great deal about work of various plant wizards, but in reality these people are not accomplishing so much as those who are paying particular attention to improving our present varieties.

Practically any characteristic desired can be developed by seed selection, based upon isolation of a particular type or strain. As an illustration of this, I have in mind where two varieties of sweet corn were established from one variety, and in this case the parent variety was developed, through this seed strain selection. The first selection was made with particular reference to size and quality and good results were achieved along this line, and the strain became so different from its parent that it was given a new name to identify it. Out of this particular sweet corn was developed another variety, the selection of which was made for earliness and resulted, by three years' selection, in making this particular strain nearly two weeks earlier of maturity. In buying seed, it is important to remember the differences in the strains within the same variety. For instance, we find five or six strains of the popular Ball Head cabbage in evidence, among which might be mentioned Danish Round Head, Danish Ball Head, Hollander and Oregon Ball Head. The desire for proper identity of these various strains has given them these various names, but it is regrettable that there is a certain amount of unavoidable confusion brought about. It is very important that this seed selection work be conducted by the same persons year after year, otherwise they may work at cross purpose and throw the selections clear out of line. In a commercial respect it is not necessarily true that all varieties are subdivided into different types or strains. For example, there is usually only one strain sold in each variety of beans, peas, etc.

Hybridizing

I have referred above to improvements by seed selection, but another manner in which improvement is accomplished is through cross pollinization or as it is more commonly called hybridizing. There are usually two kinds of hybridizing, these might be called accidental and definite hybridizing. Accidental hybridizing is brought about by the work of the wind, bees and insects which convey the pollen from one flower to another. In this way two varieties may become crossed. A great many of our best new varieties are brought out in this manner. However, the more thorough and scientific way of hybridizing is done by conveying, with a camels hair brush, the pollen of one variety to another. This kind of work requires a great deal of patience and the disappointments are many. Its use is very efficient in bridging over difficulties which could not otherwise be accomplished. To illustrate this, suppose we have two varieties of corn. No. 1 variety is of very high quality as regards flavor, but its ears are very small and the yield is so poor as to be unprofitable from a commercial standpoint. No. 2 variety is a strong, vigorous, prolific grower and makes a splendid yield but the quality is very poor. There is a good chance of hybridizing these two varieties and using No. 2 for the parent plant to produce the seed, we may accomplish a strong, thrifty growing, heavy yielding corn, which will produce the high quality and flavor which was found in No. 1. This is only one phase of the many crosses which can be brought about and which will result in improvements. Another example and one which the Government Department of Agriculture has often used for the building up of blight resisting varieties, is through the use of some strong blight resisting plant of poor quality, crossed with one of good quality.

One result from these hybrids is generally the building up of increased vitality. In the more advanced type of seed selection there is something of a tendency for inbreeding of the strain which can be overcome by hybridizing. This accounts for the fact that some of the most successful corn growers in eastern states mix a few grains of another variety along with their standard crop. The crossed pollination increases the vitality. This also accounts for the success of many new varieties when first introduced, but which deteriorate and become nearly worthless after they are a few years in use. Illustrating the marvel of hybridizing, one seed pod may produce several different varieties.

Stock Seed

Commercial seed growing in the United States represents an immense industry, and naturally the better growers conduct their production along scientific lines. We are probably all familiar with the way in which standard varieties of potatoes deteriorate, until, to use a common expression, "they are run out." This is due to the fact that farmers in general pay very little attention to saving of the seed, simply using the seed year after year without any effort at selection. In a great many cases they have used only the small potatoes, and, as a result of this, quality and production decrease each year. It is a natural law of plant life not to stand still, and, unless it is built up by selection, there is a natural process of deterioration to the wild state. This is partially due to the fact that the plants which are practically worthless for food purposes are the ones which produce the most seed, and, unless these are eliminated deterioration is sure to result. In order to overcome this, seed men have developed the plan of planting seed crops from what they call "stock seed." Stock seed is simply another term for thoroughbred seed. Thus, for example, if the seed company is growing a field of Boston Marrow squash for seed purposes, they will use only stock seed in planting the same. This stock seed will represent a selection made from the best type as regards flavor, size, shape, color, etc., and in accordance with the generally accepted standard of the type commercially. This same selection is followed out year after year, so that the type is gradually improved, and only a few of the very best hills will be used for making this selection. It will not be made with reference to any individual squash, but it will be made from those particular vines which produce a unifrom crop of the desired type suitable for stock seed. If careful attention is given to selection of the stock seed, the strain can not deteriorate, but will grow better each year. This is where patience, care and money expended by careful seed companies will produce a higher grade of seed than can be grown by the average farmer. This explains where seed growing is a special business, which can only be successfully developed by seed experts. It has usually been found that in the production of quality strains, the gradual accomplishment of better qualities has resulted in a small production of seed. This of course does not apply to cereals or those vegetables where the seed is highly developed for food such as peas, corn, etc. This, together with the additional expense, is the reaosn for the higher cost of really first class seed.

From my observation in seed selections I have been brought to believe that the weaker vitality of some of our highest bred seed strains is due to inbreeding or line breeding. Line breeding as the term is applied in seed selection begins with the isolation of a single plant for seed purposes. The whole strain is then built from this start, holding to the type year after year. The danger in this plan is that weak points are developed along with the good. Our own work has been conducted by starting with several plants with a general similarity, and the selections year after year are made from a group of plants which hold to the type required. This process is slower, but we have had no trouble in maintaining a great vitality in the seed and a vigorous growth of the plants.

Rogues

In growing a crop of seed, we find a tendency for even the most carefully selected types to revert. Thus, for intsance, in the Boston Marrow squash, which is of a rich orange color, we occasionally find some with dark green or black skins. These reversions are called rogues, and careful seed growers see to it that all such vines are pulled up and destroyed. Every effort is made to eliminate them just as soon as possible, so they will have as little chance as possible to contaminate good seed. These rogues are usually heavy producers of seed, and unless eliminated, they will show up very strong in the next crop.

In conclusion I make the following brief recommendation:

1st. Market gardeners should insist upon getting the best seed and they should be willing to pay the real value of such seed.

Live gardeners should always be willing to try out various strains of seed so as to find out the best source of supply. What they are using may be good but some one else may have a better one. They should report to their seedmen all successes and failures which are due to the seed. They should quit growing their own seed, as this is the business of experts and their own time is too precious in the garden business.

2nd. Seedmen should put more stress upon purebred seed and should push the sale of high grade seed at all times. They should realize the immense responsibility placed upon the seed trade and should encourage the commercial grower who is developing quality in seeds.

3rd. The Government and states should discontinue the practice of buying seed from the lowest bidder and buy the highest quality of seed at their real value. They are not justified in wasting the peoples money on low grade seeds, much less encourage their production,

4th. The Agricultural Colleges should cease urging farmers to grow their own seed and should devote more attention to educating young men to become seed growing experts. The colleges have already done wonderful work in developing new strains and varieties and this work should have still greater attention.

County agents by urging gardeners to make careful tests of various strains can develop competition among seed men which would be very beneficial to all. The information they can distribute regarding such tests would be of untold value.

Mr. Gill: If there are any suggestions or questions and time will permit, I will try to devote just a little time to them.

Mr. Minton: Where do you get the idea that the better the plant the poorer the seed?

Mr. Gill: The plant provides to re-establish itself. It provides seed to re-establish itself, if it is a seed plant. If root plant, the root is the storehouse for making the seed. The more we develop toward a food basis, the less the tendency is toward developing seed. Notice the difference in amount of seed between the wild carrot and the tame carrot. The higher we develop the strain, the less vitality the plant has. This is true of seeds and also of live stock. I do not know why.

Mr. Minton: It is not true of live stock.

Member: Do you mean by vitality the quantity of the seed or the vitality of the seed.

Mr. Gill: Both.

Mr. Minton: Is it true of potatoes—these are not seed—and of wheat and tomatoes?

Mr. Gill: Some of the very high strains have given as low as 50 or 60% in development. I know nothing of grains in this respect. In the tomato there is no seed but pulp. Corn and beans are seed. Best seed potatoes are grown from potatoes that are not entirely matured.

Member: Is there any virtue in planting seed potatoes later than the other kind of potatoes?

Mr. Gill: Potatoes are developed mostly in England and Ireland. There they plant immature potatoes. They say there is greater vitality. In picking tomato seed, the first ones are for seed; then they increase the mature ones. This continues only annually.

Mr. Minton: The difference between our opinions is the way we look at it. The tomato is developed for food purposes. When we develop wheat and corn we do it for seed. The more we develop the cabbage, the less it will develop the seed. If we develop away from the wild seed, then we produce the best cabbage. However, reversion will make three or four times as much seed as otherwise. More development means less seed. But it is nothing to be alarmed about. Prices will not go out of reach. Buy purebred seed.

Mr. R. E. Purden: In developing seed species, it depends a great deal on the man himself. I only know of experts that might do this but we new men might not. We cannot inbreed in stock. I have read of inbreeding in stock but it was done by people who understand the business. They got the right kind of stock and bred well. We sometimes find a man who breaks away from old theories. Charles Darwin in his theory of the survival of the fittest broke away from old theories. His son experimented with chickens. He made the experiment for twelve generations before he drew any to the cauliflower, the snowball type. It is occasionally shy of seed. The cauliflower itself develops the seed, is three or four times the weight of the actual food. The seed is three or four dollars an ounce and other cauliflower seed, seventy-five cents an ounce.

Prof. Bouquet: I made an experiment with winter luxury pumpkin. I bought some seed from a firm out here and some seed from a firm in another part of the country. One kind of seed ripened into pumpkins one hundred per cent true to type, even in size and shape and the other lot of pumpkins, supposed to be netted on the outside, were smooth. There is an awful lot in the pedigree of seed. I should like to have this meeting put itself on record as favoring Mr. Gill's remarks, that is in regard to the question of paying money for good pedigreed seeds.

Pres. Pearcy: We shall leave this matter to the Resolution Committee.

Prof. Bouquet: There is no finer onion seed grown in the state than that raised by Mr. Leedy. The lettuce seed men here are stirving to put the seed business on a pedigreed basis.

We should like to have everyone stay to hear Mr. Butner speak on the Broccoli subject. This is one of the newest of horticultural products. We expect great things from the broccoli business. We are especially desirous of making the broccoli market grow and with the greatest profits to the grower and yet there are problems in this business just the same as in the fruit growing business. We speak of this subject here because we are developing this business here in Oregon. Salem has sixty broccoli growers who have never grown this crop before in their lives. They are trying to grow a crop which we think is profitable for this part of the country. They say that our broccoli arrives in poor condition in the east. Perhaps we can get assistance from the government if we push the matter enough. Mr. Butner has had considerable experience in growing, marketing and shipping broccoli.

THE HARVESTING, GRADING, PACKING AND MARKETING OF BROCCOLI

By Foster Butner, Roseburg, Oregon

Mr. Chairman, Members of the Oregon Horticultural Society, Ladies and Gentlemen:—

After having accepted the kind invitation of your committee to say something at this time concerning the most important phases of the broccoli industry in Oregon, I was forced to the conclusion, as never before, that every item of the work, from seed selection until that happy moment when the producer has the proceeds of the harvest in his pocket, is of vital importance. However, since you have had, at various times, wide discussion upon topics related to production, I shall endeavor to confine myself to those efforts usually demanded of the grower after the crop is ready for the harvest. Doubtless, most of you will concede that this is the half-way point, that the work of production just about balances that of harvesting and marketing—making it a 50-50 proposition. But were I to make any such assertion in the presence of my sons, I am sure that they would take issue with me and claim that my 50, representing production, is in about the same proportion as the Belgian Hare served by a certain restaurant man, seeking a novelty, procured Belgian Hare and offered it to his customers. It made a hit. Very quickly he became famous for his Belgian Hare—served in various ways. Finally suspicion was aroused in the minds of his patrons; where was their host securing so many Belgian Hares? A search of his premises revealed no rabbit skins but did reveal a large quantity of horse meat. The restaurant man was brought into court. The judge asked: "In the preparation of these dishes do you use any meat other than Belgian Hare?"

"Oh, yes, some," was the admission.

"What kind?" asked the judge.

"Horse," was the reply.

"In what proportion?" demanded the judge.

"Oh, about feefty-feefty" said the man on trial.

"Explain more clearly, how much of each?" insisted the judge.

"Von horse for each rabbit—feefty-feefty," maintained the restaurant man. And I must admit that my 50-50 in the present case is something like that, for my opinion is that it is far more difficult to successfully harvest and market a fine crop of broccoli than it is to produce the fine crop.

This opinion is based upon experience. My first business experience was in selling fruits and vegetables at retail in a city market in Kentucky. A few years of this convinced me that the retail business was a hard one, that the wholesaler made all the money, the retailers being merely his servants. So I changed over and became a wholesaler. During the fall and winter I went to New York or

Michigan and bought apples, potatoes and cabbage, then in the spring would go to Georgia, Alabama, Mississippi, or Louisiana for new potatoes. green beans, peas, cabbage and like crops, then in the summer to Georgia for peaches and melons. These purchases, in the grading, packing and loading of which I usually assisted, went largely to the two markets in which our firm operated and any surplus we had was sold to jobbers in whatever market offered the best outlet at the time. Very frequently I returned home in time to aid in the disposal of the produce which I had shipped. The thing which impressed me the most was that while I frequently had to coax the farmer to sell me his produce, it usually required even more coaxing to induce the retailer to buy it. Thus I learned that the wholesaler had his troubles, that he is between two fires—that of the producer and that of the retailer. And after fifteen years of the wholesale business I became infected with the back-to-the-land germ. It may have been caused from the air of contentment, independence and general prosperity so prevalent among the farmers from whom I purchased supplies, or it may have been caused from the spirit of a poem like this:

"Come out from your smoky cities, your man-made stony hives
Where lust and greed have sown the seed that fruits in empty lives,
Where men are measured by their hoard of stealth begotten gold,
Where mothers shirk their mother work, where wives are bought and sold.

Would you grow a race of clean bred men, and women deep of breast,
Whose sons shall stand for their mother land when the Nation needs her best?
Would you sow your seed far down the years, would you save that hardy strain
That won the fight when right made might come back to the land again.

At any rate I was determined to go to the top in the produce business, so I went to the very bottom of things and became a producer. And desiring to work under the best conditions of soil and climate, I came to Oregon. For six years I confined myself to market gardening, catering to the retail stores at Roseburg, then I became interested in the broccoli industry, until at the present time I give my attention almost entirely to the production and sale of this commodity. But please bear in mind that my life experience, while confined entirely to the produce business, has run more largely to marketing than to production. So after this attempt to qualify, permit me to repeat it; it is far more difficult to successfully harvest and market a fine crop of broccoli than it is to produce the fine crop.

And now, taking advantage of the fact that you are production experts, I am going to imagine that you have produced a fine crop of broccoli and that I am to harvest and market it. The first essential is an understanding of the proper stage of maturity. I believe that Prof. Bouquet and all other authorities will agree with me that this is one of the most important items connected with the work of harvesting. But there is a stage of development when, if you have used a select strain of seed—which I am sure is the case, the inner leaves, slightly unfurled, will permit a peek-a-boo view of the beautiful white curd within. Cutting at this period gives the highest quality obtainable. To cover the head with a broken leaf permits further growth and an increase in yield, but it is well to remember that while this development of the head increases the yield it also lowers the quality of the head, and to that extent, the quality of the crop. Thus, it is readily apparent that our endeavor should be that happy medium where we may secure the highest quality possible, consistent with the yield which will permit of a fair profit in growing the crop. And here I must exercise my judgment upon each individual head, for no two broccoli heads are exactly alike any more than are any two human heads. I am going to bear in mind that twelve heads to the crate is the most popular size and that the further we depart from this number, in either direction, the more difficult will it be to market our crop. Thus, while there are limits to our variation, I am going to be more patient with a head threatening—I use the word advisedly—20 to the crate than with one threatening—again I use the word advisedly—6 to the crate. By indulging this habit of toleration on the one hand and the reverse of it on the other, I shall be able to induce many a little fellow to become a very respectable sort of 16, while by slaughtering the big fellow in his early youth, it may be possible to squeeze him into the same crate with eight or nine others of the same size. These heads cannot be placed in the same grade even though the practice is carried to the extreme where they are of the same size.

After understanding WHEN the head is ready to cut, the next step is to learn HOW to cut it. My method is to push the head toward the ground until a square-across cut may be made conveniently just below the base of the curd and leaving enough foliage to protect it.

After the heads are cut we must hurry them to the packing-shed with the smallest possible injury. For this work I use a light dump-cart, wide enough to straddle two rows and with a curved upward axle high enough to clear the tops of the growing plants. By removing a key and tilting the body gently backward and having the horse make a few steps forward, we slide the entire load either upon the floor of the packing shed or upon an elevated driveway equipped with chutes designed to force the heads by gravity to the packers. The latter method is much superior to the other, but either one quickly releases our transportation system and we are ready to grade and pack.

The bulk and unwieldy character of the crop requires that I combine these two operations. Before us on the bench, we have two empty crates, tilted to an angle of about 45 degrees; one of them is labeled "Fancy" the other "Choice." I shall take the heads, just as they have come from the field, and grade and pack them. I am going to be governed by these rules, adopted by the Umpqua Broccoli Exchange, which I have the honor of representing.

Fancy

Fancy grade shall consist of sound, firm heads of broccoli which are not ricey, fuzzy, discolored or over-mature; which are free from decay and practically free from damage caused by dirt or other foreign matter, bruises, disease, insects or mechanical or other means. Such heads must have green, well-trimmed leaves.

Choice

Choice grade shall consist of sound heads of broccoli which are not ricey, fuzzy, discolored or over-mature; which are free from decay and practically free from damage caused by dirt or other foreign matter, bruises, disease, insects or mechanical or other means. Such heads must have green, well-trimmed leaves.

WHEN IN DOUBT AS TO THE PROPER GRADE IN WHICH ANY PARTICULAR HEAD BELONGS, PACKERS ARE INSTRUCTED TO PLACE THE HEAD IN THE LOWER GRADE.

Condition of Pack

Pack as tightly as possible. Tight means packed so close together that the heads will not fall out when a filled crate is inverted before nailing on the cover.

Size of Heads

Small—16 pack and smaller.
Medium—13 to 15 pack, inclusive.
Large—12 pack and larger.

Packed in crates 8½x18x24½ inches, outside dimensions.

These standards are the result of the work inaugurated by Prof. Bouquet, on the advice and assistance of the Bureau of Markets and of our own experience. Our aim has been to work in harmony with standards already adopted by other producing sections and with which the produce trade is well acquainted.

When the crate is full we take a long knife, extending entirely across the crate, and, using the top of the crate as a guide, we cut off that portion of the leaves extending above it. This gives us a neat looking job. Each head is tightly packed, each head is closely wrapped in its own foliage—ready for the trip across the continent where some retailer, expert in his line, is waiting to trim off that surplus foliage and expose to the view of his customers some fine Oregon broccoli, to all appearances and purposes fresh from the garden. I am sure that this is no exaggeration because during the railroad strike in 1920 I was forced to test this method severely. My crop matured faster than I was able to secure orders permitting shipment by express—the only means of transportation available. So I simply stacked the packed crates in a cool packing shed and did not trim until ready to ship. So when Oregon broccoli, under ice, is reported as arriving in eastern markets in poor condition, my opinion is that something is lacking in the service of the transportation companies handling our shipments.

The proper loading in refrigerator cars is the next matter requiring our attention. I follow three rules; load cars as lightly as possible, keep this load as near the floor as possible, and see that the crates are securely striped and braced. I shall never forget the first refrigerator car I ever shipped. It was back in Kentucky. Our local cabbage market was in such poor shape that the growers offered to sell for 20c per barrel—about 100 pounds. Observing that the New Orleans market was quoted at $2.00 for the same quantity, my boyish commercial instinct prompted a speculation in this, usually, very staple commodity. The opportunity looked big, so I ordered a big car. The ice bunkers were not overly large but I never found fault with that because it left just that much more room for cabbage. And we filled that car—to the roof, loading in bulk—in the summer time. To this time I have never received a check for that car, but I am still drawing dividends in the way of profiting from the experience. So I try to give my broccoli as large a proportion of ice as possible, never forgetting that the greater the bulk the more difficult it becomes to maintain a low temperature. Mr. C. W. Mann of the Bureau of Markets, Department of Agriculture, Washington, D. C., has under consideration at the present time some work of investigation along this line with Oregon Broccoli, and I have no doubt, judging from what his department has accomplished in Texas with spinach and in California with cantaloupes, he will be of great help to us.

Now comes the final act—successful marketing. Unfortunately, that expert retailer whom I mentioned is, in the great majority of cases, beyond our reach. Between him and the grower are numerous middlemen; some of them are absolutely necessary and some of them are not. The retailer usually buys from the jobber and, for various reasons, usually has his favorite or favorites and sticks very closely to him or them as the case may be. Possibly he may feel towards them as did the grocer in the story told me recently. This grocer decided to make his will, After stating his wishes as to how he desired his property distributed, he said to his lawyer. "I want six of those big jobbers down town to act as my pall-bearers," and he named them.

"But that will never do," said the attorney. "You should get your personal friends—that would be much more appropriate." But the grocer was obdurate. "No," he insisted, "these jobbers have carried me all my life and I want them to continue until the end."

Now that may be an exaggeration of the relationship between the average grocer and his jobbers, but speaking from experiences as a salesman, I can vouch for the fact that the vast majority of grocers, after only a few years in business, have established with certain jobbers, ties which the man representing a new concern will find it very hard to break through.

And the jobber, also subject to this human weakness, has his favorites, although in buying from widely separated producing districts in large quantities, price and quality will probably govern him more largely than in the case of the retailer. However, he will eventually have his favorites for each season or commodity; a certain grower or distributor from whom he buys oranges and lemons, another from whom he secures early spuds or cabbage, another who supplies him with celery, another with Oregon broccoli—and so on through the list which he handles.

The whole matter simmers down to the simple question; do you want to form with certain jobbers and distributors a relationship of mutual advantage and lasting character, or do you prefer selling indiscriminately without ever forming with the jobber any acquaintance or friendship worthy the name? While every shipper has his own opinion upon the subject, I believe there is a tendency toward better acquaintance and a recognition of the human element which, if not reaching the spirit of the grocer who wanted his jobbers to act as pall-bearers, is closely akin to it. As evidence of this trend in business, permit me to read you an advertisement appearing in the Packer, a produce trade journal, in the issue of November 12th of this year:

"AT THE CLOSE OF OUR FIRST SHIPPING SEASON.

"We take into account the multitude of pleasant business relationships established. We have found a remarkable large percentage of receivers to be scrupulously honest, and the few instances to the contrary we can easily forget. We believe as high ideals exist in the produce trade as in any other business or profession.

"It should be remembered that as a co-operative association of growers, engaged for the first full season in shipping the major part of the crop of a leading cabbage growing state, we were exposed to many forms of attack.

"That we therefore end the season with a complete feeling of good will, is a source of deep satisfaction to us, we wish our friends to share it.

"COLORADO CABBAGE EXCHANGE,
"By W. C. Hood, Jr., Manager.

"Brighton, Colorado, November 8th, 1921."

Of course they ended the season with a complete feeling of good will! Why shouldn't they? This advertisement speaks volumes. The fact that they have ended the season with a complete feeling of good will is the strongest possible proof that they have been honest in grading and packing their produce. It also shows that instead of heaping opprobrium upon the middleman, they have recognized in him the most satisfactory medium for the disposal of their crop. The mere fact that they use printers ink indicates that they are progressive, while the spending of approximately $100, represented by this single advertisement, in an expression of their complete feeling of good will, after their shipping season is over, thus paving the way for future business upon a foundation of profitable and pleasant relationship, evidences of foresight only too often found lacking in organizations of this kind.

The broccoli industry in Oregon is in its infancy. Its future depends largely upon the men who grow and sell it. A study of the produce business of our country reveals the fact that the most successful producing points are those where an F. O. B. market has been established. To remind you, I need only mention Hood River, for apples; Yakima, for spuds; Crystal Springs, Miss., for tomatoes; Sanford, Fla., for celery and Hammond, La., for strawberries. The list is too long to go further, but if we make of our broccoli industry the success it deserves, we must establish it upon the same sound commercial basis that has made these other production centers so successful, even though it may be necessary to make some sacrifices in doing so. Suppose we do sell a few cars in the beginning below their value, based upon conditions in Eastern markets, wouldn't that be about the best advertisement we could invent? It would be just like one of the department stores advertising a bargain day. Buyers or their equivalent, in the form of bank guarantees from distant jobbers, would flock in and immediately our market would be a true reflection of general conditions and the grower—without the delay of shipping his crop upon a basis of delivery in eastern markets, would get all that his broccoli is worth—and that is all to which he is entitled. I am willing to assume my share of the risk, but after taking one hazard after another for nearly a year, in producing, harvesting, grading, packing and loading my crop, I think that it is time that the dealers engaged in distribution should evidence their interest by investing some of their money.

I believe that we should grow the best broccoli that it is possible for us to grow; that we should grade, pack and load it according to the highest standards of the trade, offer it for sale upon an F. O. B. basis, at a price which, based upon market conditions should yield the buyer a liberal profit upon his purchase. If we adhere to this plan we shall interest and hold as our steady customers year after year the most desirable jobbing trade of our country. Built upon a foundation of this kind, I believe that the broccoli industry of our state has a great future. I thank you.

Mr. Minton: Did you ship iced always?

Mr. Butner: Except where it is open.

Member: Did you put any cover over the crate?

Mr. Butner: Just three slats on top.

Member: Will broccoli do well in new ground?

Mr. Butner: I cannot answer that.

Member: How does it compare with kale?

Mr. Butner: It takes richer soil for broccoli, than for kale.

Member: How many leaves are there on the heads of broccoli that are ready for shipment? Do you cut the heads closely so that you can pack very tightly?

Mr. Butner: Yes. We do not trim until the heads are in the crate.

Member: Are the crates packed in one tier heaps?

Mr. Butner: Yes.

Member: Are the heads packed face up?

Mr. Butner: Yes.

Member: Are the leaves trimmed off afterwards?

Mr. Butner: Yes.

Member: Can you grow broccoli on the same ground year after year?

Mr. Butner: Yes. I have broccoli on land that it has been on for five or six years.

Member: Do you fertilize it?

Mr. Butner: Not an ounce. The lower or bottom part of the plant is left in the ground as fertilizer. The people who grow only small amounts of broccoli take the stalks and cut them up for the cows.

Member: How can you tell when the broccoli is ripe enough to pick?

Mr. Butner: The leaves are unfurled. Broccoli is always ready to use. However if it is left too long, it goes to seed. It is better to pick it earlier rather than later.

Member: What is the best time to transplant?

Mr. Butner: Start in June and finish when you are done.

Member: How many crates of broccoli to the acre?

Mr. Butner: About two to four hundred.

Member: How far apart do you plant broccoli?

Mr. Butner: There should be eighteen inches between the heads and three feet between the rows.

It is a problem to get crates large enough to pack broccoli heads well.

Member: How many broccoli plants are there in an acre?

Mr. Butner: Five thousand.

Member: How much seed is necessary to plant an acre?

Mr. Butner: Two or three ounces will plant an acre. The amount of space between the head of broccoli and the top of the box differs according to the size of the head. The heads are sometimes exposed between the slats of the cover. The size of the heads depends on the closeness of planting.

Prof. Bouquet: Mr. Chase has told me somewhat about the appearance of broccoli and other vegetables when they reach the East.

Prof. Bouquet: We have present with us one of the finest cauliflower and cabbage growers in Oregon, Mr. Chas. Crews of Oswego.

Mr. Crews: I do not know what you want me to talk about. cauliflower, broccoli, maggots or what. I am very much interested in this seed producing business, line breeding and so forth. I believe that you can produce anything you want. In the tomato, you produce pulp and food value. In wheat, you produce seed. I am raising cucumbers for food value and not for the number of seeds. I have to sacrifice seeds worse on that than on any other thing that is made. Take the pumpkin and the squash, for example. The squash has the least amount of seed but the most meat and is therefore greater in food value. If you segregate plants according to seed or food value, then you will not lose out on the seed end of it.

Mr. Butner has the same idea as I about broccoli growing. We cut, trim, pack and load the same and have done so for years. As to planting on new ground—new ground is far better for broccoli than old ground. It holds more air and does not get water soaked. The plant recuperates better. We take new ground without fertilizer, every time.

Member: Do you hill plants during the winter time?

Mr. Butner: We hill plants during the winter time. It is preferable to trench, however. Do not cover up plants too much. There is a tendency for mice to get into the plants. We trench to eliminate the heavy frosts. Broccoli freezes in the core and to get away from the frosts, we cut the plants short, instead of leaving them tall.

Prof. Bouquet: Mr. Butner has been largely responsible in assisting the broccoli business by doing some seed growing. People have been well satisfied with crops raised from his seed. We are nearly through for this afternoon. Is there anyone else who has a word to give us?

Mr. Chase: Mr. John Nicks of Chicago says, in speaking of broccoli and cauliflower, that broccoli is the finest thing we have gotten out of the ground in the cauliflower line, if it is in good conditiion. Mr. Nicks was the first man to handle broccoli back in that part of the country.

Pres. Pearcy: There is still opportunity to get programs and badges from Mr. Minton. We wish to express our appreciation to the vegetable growers of the state for their co-operation. If there is no further discussion, we will conclude our program for this afternoon and adjourn to meet tomorrow morning at 9:30 a. m.

Col. Dosch: There are some copies of the report of the State Board of Horticulture here. They are full of information. They are on the table in the rear of the room and are for general distribution. If there are not enough please write me for more copies.

Pres. Pearcy: I would like to remind you that the Forest Grove Commercial Club will entertain the Horticultural Society in this room tomorrow evening.

FRIDAY, DECEMBER 2, 1921

The meeting was called to order by the President, Mr. Pearcy.

Pres. Pearcy: I would like to remind you to pay your dollar to the secretary. We want all of you who are not now members of the Oregon Horticultural Society to become members. During the last year, two of our honored members have died. We thought it proper this morning to have some sort of memorial service for these two men, Col. H. B. Miller and Hon. E. L. Smith of Hood River. I am going to ask one of our members present to say a few words in honor of Col. H. B. Miller.

Pres. Pearcy: Col. Henry E. Dosch will say a few words in honor of Hon. E. L. Smith of Hood River.

IN MEMORIAM

HON. E. L. SMITH

Wherever horticulture is discussed, wherever horticulturists meet, the name of Mr. E. L. Smith is most prominently mentioned.

Mr. Smith was born in Orleans County, Vermont, in 1837; after attending the schools in that vicinity he attended Lombard College at Galesburg, Ill.; married Miss Georgiana Slocum, and moved to California in 1861; was elected to the California Legislature in 1865 and was a member of the legislative committee that recommended that Berkeley University be made a State University. He was appointed secretary of the Washington Territory in 1866; was elected a member of the Territorial Council in 1874, later became associated with Mr. George A. Barnes in cranberry business. In 1876 he came to Hood River where he actively joined the apple industry. Was Registrar of the Land Office at The Dalles from 1881 to 1884, when he moved back to Hood River as his permanent home, where he was president for three years of the Columbia River Waterway Association; was elected and became Speaker of the Oregon House of Representatives in 1888. In 1899 he was appointed a member of the State Board of Horticulture, who elected him president, a position he held for six years, when he resigned to look after his fruit interests at Hood River. Mr. Smith was also an honored member of the State Horticultural Society and no meeting was complete without his presence, as his good advice was always sought after and highly appreciated.

In an address on "Early Horticultural Days in Oregon" Dr. Cardwell says, "You scarcely realize the high ideals, high hopes, the fine feeling and earnest work of the pioneer fruitgrowers. We were just as earnest, ambitious and hopeful as you are today in apple growing. A fine feeling and friendly laudable spirit of rivalry was the spirit of the time. There was a true companionship and bonhomie in the work in a new country as far away from home and friends and relatives and all that had been dear to us—truly the experimental stage of the fruit industry."

This expresses the finer feeling, the noble aspirations and love for your fellowman within Mr. Smith himself.

The people of the State of Oregon owe a great deal to the pioneers of which Mr. Smith was one, horticultural as well as other lines of industrial endeavor, a debt which in these days of commercialism is lost sight of. Those who laid the firm foundation upon which the wealth of our grand state has been built are apt to be forgotten, hence it is due and meet that occasions like our meetings arise to keep fresh and green the memory for years to come of those to whom we owe so much. The Nestors, whose counsels have largely made our horticulture to be what it is are fast passing on.

HENRY E. DOSCH.

RESOLUTIONS

Henry B. Miller

Whereas, the strong arm of the Mighty Conqueror of all that is earthly, has again manifested his power in removing from us our highly esteemed friend and associate, Henry B. Miller, and

Whereas, the termination of a life so valuable to his family, his neighbors, his friends and the state at large, brings to us to realize in a forcible manner the uncertainties of life, and

Whereas, in the death of horticulturist, legislator, diplomat, educator and business man, Henry B. Miller, we horticulturists, especially, have lost a most ardent helper, the state a valued citizen, the family a loving husband and father, therefore be it

Resolved, that the State Horticultural Society desire to express the feelings of regret that each member feels at this termination of so valued and useful life, that we, the members of this society, unite in our expression of sympathy to his wife and children of our deepest esteemed associate in this, their great sorrow and grief.

HENRY E. DOSCH,
CHAS. A. PARKE,
C. D. MINTON.
Committee.

E. L. Smith

Whereas, since our last annual meeting under the providence of God, the Honorable E. L. Smith of Hood River, a former president of this society, has been called from our midst, by death,

Therefore, be it resolved by the Oregon State Horticultural Society, that in the death of Mr. Smith, the state of Oregon has lost one of her most respected and honored citizens, who has been a noble example of the highest type of public and private life and further,

That the Oregon State Horticultural Society mourns the loss of a member, whose enthusiastic and intelligent encouragement of all horticultural progress was invaluable, and whose efforts to increase the production of a better class of fruit throughout the state have achieved notable results.

Resolved, that this Society extend its sincere sympathy to the bereaved members of his family, and that a copy of these resolutions be spread upon the records of this Society.

C. T. REYNOLDS,
HENRY E. DOSCH,
EARL PEARCY.
Committee.

Pres. Pearcy: Mr. President, I move that we adopt these resolutions and that we all rise and stand with bowed heads for a moment in respect to these dead.

Motion carried.

Pres. Pearcy: We will now have the first number on the program, "Winning the Fight for Clean Fruit in Western Oregon," by Prof. H. B. Barss, Pathologist, Oregon Agricultural Experiment Station.

WINNING THE FIGHT FOR CLEAN FRUIT IN WESTERN OREGON

By Prof. H. P. Barss, Pathologist, Oregon Agricultural Experiment Station.

There are still in Oregon a good many pioneers who came to this state years ago from some country across the Atlantic who remember well the days when they looked for the first time upon this fair Willamette Valley with its little settlements and infant agriculture, and who can recall the delight they found in the pioneer orchards that lay close to the farm houses. To their minds comes back the memory of the astonishment with which they beheld these orchards, without special care, bearing crops of wonderful fruit, unblemished by the pests and diseases against which in the old country it had been necessary to fight unceasingly. What a surprise to them to find a land where moth and rust and scale and scab did not corrupt! Sad to say, this condition of freedom from natural orchard enemies did not last many years. The days came when this valley was invaded little by little by the scab, scale, mildew, worms and borers, increasing gradually but unceasingly. No hand was raised to stop the invasion and today we must fight to protect our fruit just as fruit growers across the ocean and on our eastern shores have had to fight for centuries.

If men had only known in those early days what we now know it might have been possible to bring out these fruits to this new country across the rockies and at the same time to have left behind their age-long enemies. But such knowledge came too late. We must now fight for the possession of the fruit borne by our orchard. We are fortunate, however, that science has placed in our hands the means whereby we can win this fight.

We might, then, ask ourselves the question: How successfully are we employing the weapons we have to fight with? How are we making out in the struggle to guard our orchards and win clean fruit? Many will answer with a discouraged shake of the head. We are now looking back upon a season which saw a very heavy toll levied by pests and diseases on our crops. Many growers fought a losing fight against them; others fought and won. The reasons are evident and point clearly to the fact that orchardists generally must learn to fight more skillfully and more persistently. There is no easy road to success in the orchard game any more than in any other. The fight for clean fruit and healthy trees is a real battle in which the grower wins or loses, depending on the kind of a campaign he makes.

Apple Scab

I am at present especially concerned for the orchards of the Willamette Valley, so many of which are just coming into full bearing. Of all our common fruit diseases probably not one has caused greater losses during the past season than apple scab. Almost everywhere we find much damage from this parasite in spite of spraying efforts. The spring, cool and moist, and rather long-continued, was particularly favorable for the spread of the disease. In a few of our apple plantings, however, even under the severe epidemic conditions that occurred, losses from scab were surprisingly low and this fact is extremely encouraging. The secret of the success attained by the few lay in their real mastery of the spraying game. It is not an easy game. The rules are many and must be rigidly enforced. The opponent is subtle and resourceful but a knowledge of his ways gives the grower the advantage in the game but he must apply this knowledge at every step. He must make the first move and never give his opponent a single advantage as long as he is in the game or the grower stands to lose.

Early Plowing

The scab fungus lives over from year to year in the old fallen leaves of the season before. Our first attack is on this source of early spring infection. We must turn these leaves under and bury them before they can bombard with spores our trees as they send out their tender leaves and blossoms in the spring. This is the first chance at the disease the grower has, so that wherever possible early plowing should be practiced every year.

The Delayed-Dormant Scab Spray

Then, since scab will attack the first green parts as soon as they emerge from buds, we must cover these tender parts promptly with a protective coating of lime sulfur poison. We name this first application for scab control the "delayed-dormant" spray. The exact time for this will depend upon the season and the earliness of the variety but it should be put on when the little leaves of the blossom clusters first separate so as to allow us to touch and protect with spray the tiny cluster of undeveloped blossom buds. This is a very important spray and careful timing is essential for best results. Without this early protection many scab spots will develop each a new source of infection ready to shed spore-showers upon the new growth as it further unfolds. In a climate as favorable to scab as ours this application cannot safely be neglected. It is also the most important spray of all for apple powdery mildew.

The Pink Spray

The season advances, the leaves expand, the blossoms are ready to burst and—the scab we have always with us. Further protection is, therefore, necessary to carry over the bloom period. We must apply our "pink" spray of lime-sulfur. The leaves must be coated above and below and the blossom clusters thoroughly protected.

The Calyx Spray

The bloom is past, the petals drop, more leaves have expanded, the fruit is beginning to grow. The "calyx" spray is now applied and to the lime-sulfur we add lead arsenate. This is done so that the calyx cups on the apple, before they close, may be filled with poison ready for the coming day when the tiny codlin worm will try to gain entrance by that route. Because of its double value this spray is rarely neglected by the grower, but the records in our orchards show that unless this spray is preceded by earlier application of lime-sulfur, failure in scab control will result almost without exception.

The Fifteen-Day Spray

One can never spray so continually or so perfectly as to prevent absolutely all infection in the early spring. There are always some scab spots producing spores. This must be borne in mind as the season advances and each rainy period must be thought of as giving the scab another chance. We cannot stop with the "calyx" spray under Willamette Valley conditions. About two weeks later another protective covering should be applied.

The Thirty-Day Spray

And now the codlin moths will be flying about the orchard ready to begin laying eggs as soon as the evenings are warm enough. The growing fruit needs protection against the first brood worm. Lead arsenate must be applied and with the poison it is best to add another dose of lime-sulfur as a last parting shot at the scab and mildew. This application comes just about a month, as a rule, after petal-fall.

This is the end of the scab program, for, with the summer heat and dryness, the scab can make no further progress, although the worm dieth not and other worm sprays must be given. It is a long program but from the nature of the pests it has to be. It was necessary for Hood River to find this out by bitter experience, but its wonderful clean apple crop of 1921 shows how well it has learned the lesson. The effects of persistent and rigid adherence by Hood River growers to the schedule outlined above has reduced the scab disease to a point where serious epidemics are now unknown although a few years ago tremendous losses from this cause were sustained. When the Willamette Valley has learned the spraying game as Hood River has done the same results will be reached.

Powdery Mildew

Although I can discuss only a few orchard troubles, I must not overlook the powdery mildew. Some varieties like Jonathan and Grimes are especially susceptible to this disease and much loss is annually sustained as a result of the russet network which it causes on the fruit. Many growers have become disheartened in their efforts to control it, but there is every reason to believe that the losses from this cause can be greatly reduced even if not entirely prevented.

Symptoms and Overwintering

The powdery mildew is a white mold that grows over the surface of the leaves, and tender fruit. It is difficult to handle because of the way it lives over from one year to the next inside the dormant buds. When the leaves and shoots emerge from such infected buds in the spring they are covered with the whitish powdery growth. This mildewing of the first new tips cannot be prevented by a spray since no dormant spray can reach and kill the fungus which lies over winter protected within the buds.

Effect of Lime-Sulfur

If, however, a thorough coating of lime-sulfur is applied to these first-formed mildewed shoots, the mildew which it touches will be killed as shown by repeated experiments. Furthermore, the uninfected foliage and fruit will be protected by this fungicide. Unfortunately, no spray can reach the mildew which may be present among the folded leaves at the shoot tip. Hence, in spite of any spray, as these leaves unfold later on they will develop the same white coating in spite of the spray and will shed spores until later sprayings are applied and put a stop to this.

Spray Not a Failure

It is this fact that spray cannot penetrate the buds and shoot tips and hence cannot kill the tip mildew entirely that leads many of the growers to think that sprays are a failure. They are effective and afford much protection but there is a natural limit to the results they can accomplish. When, however, it is realized that all parts of the foliage and fruit that are coated with spray from the scab applications are also protected against mildew, the grower will see a reason to be more conscientious than ever about his spray program.

Fruit Attack Comes Very Early

Certain observations recently made point to the probability that most of the mildew russet on the fruit comes from mildew attack which takes place in the very earliest stages of fruit formation. It is believed that much or most of the damage may be done before the blossoms open. Hood River experience of this last year points to the special effectiveness of the "delayed-dormant" and the "pink" sprays in the prevention of mildew russet. Most of the mildew injury on Jonathan in 1921 was found on orchards where the growers thought scab so nearly eradicated as to allow them to omit the early spray. They did not think about the danger of mildew at the time but they will certainly remember about it next year.

Pruning for Mildew

Another point. The buds that form on mildewed shoots will almost invariably be infected and give rise to white mildewed plumes in the tree the following spring. Much advantage is gained by carefully removing at pruning time all of the old mildewed shoots that can be detected. Furthermore, it is a wise practice to go through the orchard during the growing season clipping off with the pole shears all white tips within reach. Through the persistent application of these methods along with the regular spray program the mildew has become a thing no longer to be feared in many orchards. No other spray material has shown positive superiority to lime-sulfur for mildew control under western Oregon conditions.

Spray Burn

Very severe damage, often accompanied by defoliation and fruit drop was found following lime-sulfur sprays in many apple orchards in western Oregon last spring, especially with the "calyx" spray or the application following it. The Experiment Station had opportunity to study the causes of this injury only in one or two cases and then only by observation, but certain facts were discovered which seem in part to furnish some possible explanations.

Sulfur Shock

First may be mentioned "sulfur-shock," as it has sometimes been termed. Investigation has shown that under some conditions when a tree is not sprayed with lime-sulfur for the first time until after blossoming, earlier applications having been omitted, it sustains some kind of a shock which is not felt when lime-sulfur sprays are begun with the "delayed-dormant" application followed by the "pink" to pave the way and render the tree, as it were, gradually resistent to sulfur effects. It is important, then, to start the lime-sulfur spray season promptly and keep it up in the proper manner.

Weather Factors

It is a well known fact that trees vary in their sensitiveness to lime-sulfur according to their physiological condition. It is, for example, pretty well established that after a long period of dark, cool, moist weather when there has been little opportunity for food manufacture through photo-synthesis by the leaves, the foliage is especially spray-sensitive. These conditions prevailed rather more than usual in many sections of western Oregon last spring and may account for some of the effects reported.

Tree Vitality

Delayed spraying and dull weather cannot, however, account for all the trouble observed. Examples were found where orchards of the same age and varieties, located side by side, showed extreme differences in spray effect when sprayed at the same time with the same strength of lime-sulfur. In one orchard in particular which was visited last spring, severe leaf-burn and drop occurred in the trees owned by one man while the next rows under other ownership showed no spray burn whatever. In this instance the injured rows had not received proper early cultivation and the resultant temporary lowering of vitality may have contributed to the burning. Numerous instances have come to the attention of the Experiment Station in other years where unfavorable soil conditions and unhealthy root conditions appeared to have a relation to lime-sulfur leaf burn.

Early Soil Cultivation Desirable

The breaking of the ground in an orchard very early in the season is a great advantage to the trees. Improved soil aeration and beneficial bacterial activity in the soil are immediately brought about and healthy operation of the root system is promoted. The general vitality of the tree is helped in this way and the chances for successful fruit setting are believed to be increased. Better moisture retention by the soil through the spring and summer is encouraged and all this will affect favorably the health and vigor of the tree. As a result one might expect an increased and appreciable resistance to spray injury, other things being equal.

Spray Strength Not Major Cause

Strength of spray does not appear to have been of any great importance in the cases of spray burn experienced last season. Most growers used the standard recommended strengths which have been tested for years and found safe under all ordinary conditions. For the explanation of serious spray burn we must look rather to the effect of weather conditions or of the vitality of the tree and activity of its root system than to strength of spray.

Scab Spot Burn

It must be mentioned at this point that where scab has once been allowed to get a start in the tree for any reason much leaf burn will appear as a result of the spray penetrating and killing out the scab spots already formed on the leaves. In such instances had proper spraying been done from the first no such injury would have been experienced.

Spray Pointers—A Lesson in Economy

Many growers have failed to secure reasonable scab control in spite of careful attention to strength of spray, and number and timing of applications. We have to thank Mr. LeRoy Childs, of the Hood River Branch Experiment Station, for throwing some light on failures of this sort. Every grower should read his studies on "Spray Gun versus Rod and Dust in Apple Orchard Pest Control," as presented in Oregon Station Bulletin 171. On the inside of the cover page is an illustrated story that should be read to be appreciated. It is based on actual records from two seventeen-year-old orchards sprayed seven times each. The first orchardist paid out 76c a tree for the season to protect his crop. He did his work thoroughly. The second paid out only 55c a tree. He thought he was economical. The first orchardist had more than 95% of clean fruit in his harvest; the second less than 82% clean fruit. The loss from diseased or worm-eaten fruit sustained by the second grower was $1.04 per tree more than that of number one. A saving of 21c a tree in spraying caused a loss of $1.04 in fruit. This is a thought-provoking example.

Thorough Coating Essential

Thorough covering is essential to success. Were some of the failures of the past season attributable to lack of thoroughness? Figures presented by Mr. Childs show from a survey of well protected Hood River orchards that it takes for the average 11-year-old apple tree a little over 4 gallons of spray for each application for best control and for a 17-year-old tree between six and eight gallons per tree. This gives us a good basis by which to judge our own spraying and will probably explain the size of some of the 1921 cull piles.

Reaching the Tree Tops

Another question is also important. Enough spray may be used but does it get there? Are the tops of the trees well covered? We must not forget that the foliage next the sky must be protected against infection or showers of spores will rain down all spring on the fruit beneath. Mr. Childs has shown how often the upper third or fourth of the trees are imperfectly sprayed. If the topmost bough cannot be successfully sprayed from the ground, a tower must be used and more towers would be a good thing for western Oregon.

Iron Sulfate an Aid

A great aid to thoroughness employed for the spring apple sprays by many orchardists is the use of an indicator made by adding iron sulfate to the lime-sulfur spray. A half pound of iron sulfate (dissolved in water first) is added to the tank of spray for every gallon of concentrated lime-sulfur put in (or for every 4 pounds of dry lime-sulfur used.) We call it an indicator because the black color which we get as a result makes the spray so conspicuous that the operator can tell just how thoroughly he is covering everything and this is accomplished without any practical detriment to the efficiency of the fungicide.

Adequate Spraying Capacity

One of the chief reasons for spraying failures in many orchards is undoubtedly the lack of spray outfits of sufficient capacity or to the lack of a sufficient number of outfits to cover the ground in a satisfactory manner. As a consequence of this lack the grower has a hard time in the prompt application and accurate timing of the different sprays. Growers must be able to get the work done thoroughly and at the right times or else good pest and disease control is not possible. There is absolutely no way to dodge this fact. Must western Oregon growers in general go through the experience of repeated losses like those or 1921 from pests and diseases before they learn how to play the game to win?

In this article we have considered only the apple orchard and discussed only a few of its parasitic troubles in order to bring out the principles involved in the winning of the fight for clean fruit. The same foundation ideas apply to the control of many other fruit pests. The spraying game is a stiff game and no grower can afford to go into it except to win. The welfare of Oregon horticulture, however, demands that many more growers shall come to understand the rules of the game, shall put up a fight to the finish and then claim the prizes awarded to all successful contestants.

Pres. Pearcy: To use Prof. Barss' own words, this is a thought provoking subject. Are there any questions.

Member: What strength of semi-dormant do you use?

Prof. Barss: One to twenty-five. Thoroughness is more necessary than strength. I used to spray as strong as I dared.

Member: Is it the same for pears?

Prof. Barss: Yes, but a little weak. There is a tendency to russet. Mr. Childs of Hood River has done the most extensive work on spray experimentation in Oregon. His work is very valuable to us. He is wondering if russet is not due in some part to mildew on the pears. Pears are very sensitive to scab.

Member: What about anthracnose on pears?

Prof. Barss: We have not had very much evidence of anthracnose on pears except in the immediate vicinity of apple orchards to pears. Anthracnose spreads from apple to apple and not from apple to pear. The anthracnose does not constitute a problem in the pear orchard. There are some cankers which are mistaken for anthracnose.

Member: What pressure do you use for rod and gun spraying?

Prof. Barss: I did not discuss a good many things. Bulletin No. 171 will cover your question. I would rather refer you to that. It is a contribution to the problem of spraying.

Member: Are there any conditions that would prefer other than lime sulfur?

Prof. Barss: Bordeaux does not apply to scale.

Member: What kind of spray do you use if you are going to spray peach trees?

Prof. Barss: For blight we spray peach trees as soon as we get the crop, for six-fifty bordeaux. For leaf curl, spray any time from now to February with the same material. Pick out a good day.

Member: Do you make your own bordeaux mixture?

Prof. Barss: There is nothing superior to home made bordeaux mixture. Store made bordeaux mixture is very inferior to home made. Bordeaux always breaks down very quickly and changes from a gummy consistency. The flakes break down and crystal particles form. These do not have the same effectiveness as the original has. A little bit of sugar will help to save it and keep it in good condition. One-eighth of an ounce of sugar to one pound of bluestone will save it.

Member: Will more hurt it?

Prof. Barss: You can use a little more. If you use four times as much the liquid would turn from blue to gray and would take the copper out of the sediment.

Member: Is there any value about warming bordeaux?

Prof. Barss: I do not know what the effect would be.

Member: Some one claims that adding hot water to bordeaux will help.

Prof. Barss: Various temperatures have not accomplished much.

Pres. Pearcy: Are there any further questions?

Member: Is it necessary to put the mildewed branches in sacks and destroy them or can they be left on the ground?

Prof. Barss: Mildew will not develop one minute after the twig is cut off. Perhaps that is an exaggeration. As soon as the twig begins to wither, the mildew is dead. However, the spores might blow to the tops of trees.

Mr. Allen: I have found bordeaux made in many different ways. Is there not a proper way to make bordeaux?

Prof. Barss: Many growers are interested in this question. From tests that have been carried on, it has been found that good bordeaux may be made in various different ways. Of course there are two things that have to be done in any case. You have to slake your lime and dissolve your bluestone and mix the two together. Do not mix together in the concentrated form. If you weaken with water, you will make a finer quality of bordeaux. But the standard way is to dissolve the raw materials and weaken each to the full extent necessary and pour the two into the spray tank with the agitator running. This is a safe and good method. If the two materials can be mixed together gradually then the bordeaux will be good. And if you go right away and spray, it will do the work for you. Variation in the care of bordeaux is very slight until you use the concentrated materials.

Pres. Pearcy: At another stage in our program we will call upon Prof. Lovett to speak on spreaders. The next number on the program is "Advertising Fruits to the Consumer," by George S. Hall, of Hall & Emory, Advertising Experts, Portland, Oregon.

ADVERTISING FRUITS TO THE CONSUMER

By George S. Hall, of Hall & Emory, Advertising Experts,
Portland, Oregon.

The subject of advertising fruits to the consumer is a broad one. There are so many angles of advertising as regards fruit that it would take considerable time to go into every angle of advertising.

We have gathered two campaigns—one is the poster campaign by the Oregon Growers' Co-operative association and the other is King's Products. The latter is prepared in our own office, is this year's campaign and is a complete campaign.

Getting back to the subject of advertising—it begins with the grower himself the horticulturist. Upon his product, the advertising is based. (Prof. Barss went over one point which may not have seemed to you important as far as advertising is concerned. The product must be of good quality. What he gave you ought to have direct influence on advertising. Men may spend thousands of dollars on reading up and working on the subject but if it (the product) does not measure up to quality, it accomplishes nothing. Getting down to this matter of quality, I will touch on a number of points that may not seem important to you. Raise the standard of your product. Sprays are very important to me. I have an orchard and I am interested in horticulture.

Passing from quality, the next thing is branding. Simply advertising Oregon foods will not give any definite information. Oregon prunes have been known for years but no longer than California oranges. California has selected Sunkist as the keyword for advertising oranges. Oregon growers have selected Mistland. The brand is the real tie-up between the product and the consumer. How far would California oranges go if they had no brand? You will recall when Portland streets were crowded with orange sellers. Oranges sold at 20c a dozen. They are now sold for 50c and more a dozen. Why? Because they have branded them. Florida did that. California has impressed upon the nation the word Sunkist. This word relates to oranges. This word has actually brought thousands of dollars to the people of California. When Sunkist advertising first started, a great many inquiries that came to California from people all over the nation were not in regard to oranges but in regard to securing land in California and coming out there. This is what has followed the California campaign on oranges. I used the oranges first because they were the first product to make a brighter market and better prices. Now the lemon, the walnut, alfalfa and so on are branded. When you can sell hay by branding, you can sell anything.

Now as to packing—with few exceptions, the day of bulking products is passed. Oranges are wrapped separately now. Last winter, I asked Mrs. Hall if she had any oranges in the house. I told her to be sure to order Sunkist oranges. And so she ordered Sunkist oranges. One night I wanted an orange before I went to bed, so I went and got one of the oranges she had bought. It had a wrapper on it but it did not look like a Sunkist wrapper. Sure enough, it was not Sunkist but Suntwist. That just goes to show how some people can twist words. There was someone trying to cash in on Sunkist oranges. In California they have the Sunsweet prune. They have capitalized the word Sun. They have monopolized the sun. They and they alone use it. The time has come when all products will be put up in packages if possible. Some products are put up in five-pound boxes. Others are put up in smaller and more attractive boxes. During the stock show in Portland they sold attractive boxes of prunes.

From packing, let us turn to the market. No great success was ever reached by attempting to heap the fruit. Choose your market. In California there is no good market for their own products. Choose the market that is most susceptible to your product.

As to the manner of sales and distribution, I do not feel qualified to go into this matter very deeply. Advertising is directly for the jobber and retailer as much as the consumer.

Competition—the Italian prune and the petite prune are competitive. We advertise prunes as a good breakfast dish or noon day dish. Other fruits come into competition with the prunes and the oranges.

The demand for fruits must be created primarily by the advertiser. The advertising of fruits, expensive and otherwise, paves the way for the sale of them by the salesman. The grocer and jobber know the advertiser and they will respect your product if you advertise well. Then comes amounts of demand. One season of advertising will not entrench your product in a locality. You will find that people are improving their advertising, adding new ideas, etc. They tell of the medical side of it, the conditions, the minerals. A person has got to make a thorough study of the product. They study the orchard and the plant. They must be well versed in the markets and in the selling business. Out of all that comes the basis of argument in advertisements. Advertisers have test kitchens. The California people and the King people continually experiment and tell the people why they should use certain products and in what season. Recently—just this season—the raisin people of California have been packing their raisins in five cent packages. You have seen them. Prune associations have been putting out a five cent package of prunes. The prunes can do that as well as the raisins. It is surprising the number of these empty packages that you find. You will find them in trains and on streets. They have done this by advertising. "Have you had your daily iron?" Raisins have iron in them. Loads of business men have a sandwich for lunch and then eat a package of raisins. There is a wonderful opportunity for selling the prune. The oversupply in California has been taken care of in this way. We used to think of the raisin as a Christmas confection, and the same way with the walnut. Now we find the raisin in restaurants, hotels, bakeries, etc., in salad, bread, etc. We eat it raw and we eat it in the cooked form. Take the California walnut. I do not know if it is branded or not. They had a campaign about two years ago in which they offered five or ten thousand dollars for a machine that would brand walnuts separately. They must not have accomplished their purpose for there has been no such walnuts on the market, and I see no more about the matter in the papers. Eggs are being branded now in that way in a great many communities.

I will explain the mission of the poster. Just as soon as the advertisement campaign is prepared, we prepare a poster. The poster is a miniature of all the advertisements that will appear in the newspapers at a certain time. We send posters out to the grocer so he can see what we are specializing on at that particular time. We reprint posters in the newspapers in larger form. Then we tell the grocer that we are advertising in the papers or are sending out catalogues or are sending letters to housewives. Posters of Oregon Growers' products are appearing in New York subways. They are subway posters.

Here are a few advertisements which have appeared in national magazines. This raisin advertisement is a Christmas suggestion. It is true to form and color. There are also walnuts and almonds to give contrast to the picture. These are made directly from the paintings. The artists are among the best in the country. Some of them are making two thousand dollars a month for their work so you can see they are very high grade. It has to go through the process four different times. The colors are usually red, yellow, blue and black. Numerous advertising devices are used—suggestions for definite methods of serving oranges; save a certain number of wrappers and the housewife will obtain a recipe cabinet. Here is the advertisement of the Blue Ribbon peaches. They sell California in this advertisement, just as if they sold the only peaches in the world. We must say we sell as good peaches as anyone else. The Sunkist people are capitalizing sun in their advertising.

There is no such a thing as an advertising expert. We make a study of the advertising business, publicity of any commodity, the particular method of securing the interest of the public regarding the product and the putting it in form to appeal to the consumer.

Member: What form of advertising places the product in the hands of the consumer?

Mr. Hall: That is difficult to answer, especially if you distribute your product in all states of the country. Magazines have the advantage in that they are able to show color. Color appeals to everyone, and that is a strong feature. Newspapers are striving to use color in their advertisements. The answer to your question is—analyze your product.

Member: Are not the newspapers the best form for bringing the product into the hands of the consumer?

Mr. Hall: They are accepted as the strongest and best form. You can reach the reader once every day for a week. The loganberry juice was advertised nationally when it should have been advertised territorially, section by section. National advertisement is very expensive and not always the best. Take the Oregonian. It has a circulation of eighty thousand. Does that answer your question?

Member: I just want to know what you thought about it.

Mr. Hall: We have to know where the product is to be sold and how it is to be sold before we can advertise it and sell it.

Pres. Pearcy: May I add one interesting point? The Pacific Fruit Exposition was held in Seattle recently for five days. One association has the blue goose for its sign. On Tuesday evening of this meeting, there was a very fine banquet. Each person in attendance at the banquet was presented with a red apple upon which was stamped a blue goose. This stamp was done by a very delicate electrical device. It printed the apple but did not rot it. The design was not more than three-quarters of an inch wide but it certainly was a clever and interesting feature.

Member: Can that be done commercially?

Pres. Pearcy: Yes, for special occasions. Some sort of special stamp was to appear on the walnut this year. The Skookum people are doing the same thing. They put a skookum design on their products. The next number on the program is "Soil Fertility and Its Relationship to Orcharding," by Prof. Clayton L. Long, Extension Specialist, Oregon Agricultural College.

SOIL FERTILITY AND ITS RELATIONSHIP TO ORCHARDING

By Prof. Clayton L. Long, Extension Specialist,
Oregon Agricultural College

The most successful orchardist is the one who recognizes the several necessary fundamentals of fruit growing and is capable of classifying them in their order of importance for his own particular orchard. These essentials he groups as follows: 1. Soil management including the maintenance of a proper soil mixture, an abundant supply of organic matter incorporated in the soil and a sufficient and properly balanced soil fertility. 2. Pruning, for the purpose of maintaining a more equal distribution of light to the entire leaf surface; a common sense distribution of the fruiting wood and for facilitating pest control. 3. Pest control, including the prevention or cure of economic injury from rodent, insect or disease pests. 4. Thinning of the fruit for the purpose of producing a more marketable product at a greater profit to himself. These four fundamentals of his business he not only considers individually but collectively, together making up the one most profitable method of handling his orchard. No one of them is decided upon or adopted before he determines the effect it will have upon the system as a whole or upon any one of the others.

Each step in his system of orchard management either tends to bring this year's crop of fruit to maturity in the most profitable condition or to maintain the vigor of the tree against its own natural tendency to become old or devitalized. He carries on his orchard practices for the continuation of a fairly vigorous wood growth as well as to bring about an annual crop of large, perfect well colored fruit.

Soil management, the first of these four essentials, and by far the most fundamental, is the subject to which I have been assigned. The management of anything to be a real success should be based upon a thorough knowledge of the subject to be managed. An orchard soil is no exception to this rule. Where it will be impossible at this meeting to make a thorough study of any particular orchard soil, it is possible to study a general one. Such a soil is a porous mass of rock and organic particles, moistened with that water retained after thorough under-drainage, ventilated by a slow circulation of air and alive with minute organisms.

There are ten (10) elements or materials necessary for tree growth or fruit production. These are carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, sulfur and iron. No fruit tree can live or produce without all of these. The first three (3) carbon, hydrogen and oxygen, usually available in unlimited quantities from air and water, make up approximately ninety-five (95) per cent of a fruit tree and its crop. The other seven (7), nitrogen, phosphorus, potassium, calcium, magnesium, sulfur and iron combined supply the other five (5) per cent or thereabouts. The last four (4) calcium, magnesium, sulfur and iron are used by fruit trees in very limited amounts and are sufficiently supplied in common orchard soils. Where alfalfa is used as a permanent cover-crop in the orchard, sulfur may be used to advantage. Two (2) of the remaining three (3) elements phosphorus and potassium are used for growth and production in larger quantities and may in the future become limiting factors in fruit growing, but to date have been supplied in amounts great enough to meet all needs for growth and production. One or both of them may be used to advantage in growing cover-crops for rebuilding a run down orchard soil or maintaining a productive one. The remaining element, nitrogen, largely supplied by the organic matter of the soil, is the one to first disappear from cultivated soils. The organic matter being the most unstable part of the soil rapidly decays and disappears under the usual methods of management, leaving the trees with only a limited amount of this much needed element. In fact some remarkable results in increased production as well as growth have been secured in orchards throughout the state from the use of nitrate of soda, unaccompanied by any effort to return the burnt out organic matter. The following chart illustrates the orchard feeding problems:

Chart 1

Two groups of foods.	Necessary elements.	Sources of supply.	Amounts needed.	Factors limiting the total supply.
Air Food	Carbon	Air	95%+ of food requirements	Amount and green color of leaf surface exposed to good light.
	Oxygen	Air or water		
	Hydrogen	Water		
Soil Food	Nitrogen	Organic matter of soil	5%— of food requirements	Size of feeding root area and amount of available soil fertility. (Nitrogen carrying organic matter being the limiting factor.)
	Phosphorus	Mineral matter of soil		
	Potassium	,,		
	Calcium	,,		
	Magnesium	,,		
	Sulfur	,,		
	Iron	,,		

The paramount problem of the orchard men today is finding an economical means of returning to their soils this dissipated organic matter and then maintaining it. The moisture holding capacity of the soil, the number of minute organisms, the availability of the other soil elements, the physical handling of the soil, the productiveness of the soil are all dependent upon this same organic matter. Indeed, it is generally conceded that the supplying of this one material organic matter in sufficient amounts constitutes the first and most fundamental step in rebuilding a worn out soil or maintaining a fertile one.

In order to comprehend fully the fertility problem as related to orcharding, it is well to consider the extent and sources of losses of fertility from orchard soils; for it is recognized that for continued profitable fruit production and a constant maintenance of soil fertility it is necessary to return to the soil as much fertility as is removed by the various agencies at work. These agencies are crops removed, drainage and leaching, and oxidation of nitrogen and organic matter.

Chart II

Losses by Crops Removed

Fertility Removed Annually Per Acre By An Apple Orchard

	Wood	Leaves	Fruit	Total
Annual Wt.	3500 lbs.,	3500 lbs.,	24500 lbs.,	31500 lbs.
Nitrogen	11.3 lbs.,	35.6 lbs.,	16.2 lbs.,	53.1 lbs.
Phosphoric acid	3.6 lbs.,	5.3 lbs.,	6.4 lbs.,	15.3 lbs.
Potash	6.6 lbs.,	15.9 lbs.,	41.5 lbs.,	64.0 lbs.

The above table shows that an acre of vigorous, producing apple trees removes nitrogen equal to that carried by 340 pounds of nitrate of soda. Phosphoric acid equal to that carried by 95 pounds of 16% superphosphate and potash equal to that carried by 135 pounds of sulfate of potash. Generally speaking one acre of apples does not remove as much nitrogen as an equal area of ordinary farm crops, about the same amount of phosphoric acid and considerable more potash.

Losses By Drainage and Leaching

If the fertility removed by the trees constituted the total loss the problem would not be so difficult but there are losses through other channels as well. Fertility existing in a soluble form is liable to be lost in drainage water or by leaching down through the subsoil, beyond the feeding roots. The amount lost in this way depends upon the amount of soluble fertility, the nature of the subsoil and the amount of rainfall. The heavy rainfall and the mild, open winters of Western Oregon are conditions ideal for such losses, and undoubtedly contribute greatly to the deterioration of these soils. The most serious loss from this cause is that of nitrogen. This is the most deficient of the three key elements in our orchard soils, especially where clean cultivation without annual cover-crops in manuring has been practiced. It is also the most expensive to supply costing in commercial forms about 20c a pound. Experiments made at Rothamsted, England, upon productive land, with an average rainfall of 28.2 inches and an estimated drainage of 10 inches, resulted in a loss of more than 35 pounds of nitrogen, equivalent to that carried in 225 pounds of nitrate of soda. With the much greater rainfall of Western Oregon, drainage from these soils would be even greater.

Phosphorus lost by drainage is generally conceded to be small as little of it exists in soluble form at any time. Potassium is lost in greater amounts although not equalling the loss of nitrogen. The fruit soils contain large amounts of this element, but practically all of it exists in an insoluble form; hence, the loss of even a part of the soluble amount is of vital significance to the grower.

Another important source of loss is through the decay or oxidation of the organic matter of the soil. This process consists in a combination of the substances of the organic matter and the oxygen of the air. Most of the compounds formed are gases and pass off into the air. The more contact there is with the air the more rapid decay or oxidation proceeds. The organic matter carries practically all the nitrogen of the soil, hence this process materially affects the nitrogen of the soil. Clean cultivation and exposure of the soil to the air and rays of the sun hastens this process. The extent of this loss has never been fully determined but there can be no doubt but that it is very large.

Probable Losses of Fertility Annually

After all practical precautions have been taken to check the losses of fertility from the soil it will be found that large losses still occur. The Minnesota Experiment Station after making several tests, conclude that from three to five times as much nitrogen is lost from the soil annually as is removed by crops.

The Canadians found that by twenty-two years of grain farming, practically one-third of the nitrogen of their soils to a depth of eight inches was lost.

There is no investigation known to the speaker which indicate the total loss of fertility in fruit growing and it is more or less hazardous to make an estimate. Taking everything into consideration, however, it will certainly be within the facts to assume that where apples are grown under clean cultivation, there is an average annual loss of 200 pounds of nitrogen, 20 pounds of phosphorus and 75 pounds of potassium that is the equivalent of 1275 pounds of nitrate of soda, 285 pounds of 16% superphosphate and 190 pounds of high grade sulphate of potash.

Counteracting the Losses of Fertilitiy

Whenever practical it is far better to prevent the loss of fertility than to replace it after it has disappeared. A feasible and economical means of preventing a part of this annual waste is that of growing a cover-crop.

Many orchardists go to great trouble and expense in hauling manure and buying commercial fertilizers and neglect continuously the opportunity to grow cover-crops. An annual cover-crop of Oregon vetch or one of the winter grains and Oregon vetch combined with the crop of leaves from the fruit trees, which is usually lost where no cover-crop is grown, will permanently maintain the supply of organic matter and nitrogen on a productive soil. Worn out orchard soils can be brought back to life and productiveness by the same cover-crop if supplemented by light top dressing of manure or one hundred and fifty (150) to two hundred (200) pounds of nitrate of soda applied broadcast at the time of seeding. This fertilizer will insure a rank growth of the cover-crop which could not be secured on a poor soil without some fertilizing, and soon replace the depleted organic matter of the soil gradually decreasing the need of the fertilizer and finally doing away with them almost entirely. Manure, straw or any other crop refuse available applied to these worn out soils will be of great help in their rejuvenation. None of these refuse materials should be permitted to go to waste within hauling distance of any commercial orchard. Wheat straw contains as much nitrogen as sixty-two and one-half (62½) pounds of nitrate of soda as much phosphorus as eleven and one half (11½) pounds of superphosphate, as much potassium as forty two and one-third (42⅓) pounds of sulfate of potash and a great bulk of soil improving organic matter.

The profitableness of orcharding depends more upon the ability of the soil to supply the moisture and fertility needed to insure a good wood growth and a large production of fruit than any other one thing. This soil is handicapped by a depleted organic matter content which must be returned before high production can be secured. It may be returned by the annual cover-crop seeded from August fifteenth (15) to September first (1) in any Western Oregon orchard. The favored few may make use of an available supply of manure, straw or other refuse. This nitrogen carrying part of the soil is as essential to success in fruit growing as the fruit tree itself, it is the first step to a more economical production. Take it.

Mr. Minton: I suggest that we postpone the questions until after luncheon as it is after twelve now. Just a moment, please, before we adjourn.

Pres. Pearcy: We have a very prominent horticulturist in our midst. We wish to extend this little token to Col. Dosch to pay, at least in some small measure, for what he has done for Orgeon horticulture.

Col. Dosch: How did I come to this place? I thank you. I thank you.

Pres. Pearcy: The meeting is adjourned until one thirty this afternoon.

FRIDAY AFTERNOON

The meeting was called to order by the President, Mr. Pearcy.

Pres. Pearcy: If there is anyone who would like to ask Prof. Long any questions, we will take time for them now.

Prof. Long: There is not much time for questions because of the full program this afternoon. However, I will try to straighten out anything that I can.

Pres. Pearcy: The first number on our program for this afternoon is a lecture illustrated by stereopticon slides. Mr. C. A. Reid, nut specialist from the U. S. Department of Agricultude, will speak to us on "Nut Culture." But before Mr. Reid begins to speak, I should like to have Mr. Hanneman say a few words. Mr. Hanneman has been instrumental in getting up a bulletin on filbert culture, the material for which has been collected in the Northwest.

Mr. Reid here presented a number of stereopticon views of nut trees of all varieties in different parts of the United States which proved of much interest to those present.

Pres. Pearcy: Are there any questions? The next number on the program is "Important Problems, Both Present and Future, in the Horticulture of Oregon," by Prof. W. S. Brown, Chief in Horticulture, Oregon Agricultural College and Experiment Station.

IMPORTANT PROBLEMS, BOTH PRESENT AND FUTURE, IN THE HORTICULTURE OF OREGON

By W. S. Brown, Chief in Horticulture, Oregon Agricultural College and Experiment Station

These are times of financial stress in all lines. The pessimist sends up his wail throughout the land. Farmers as a class have been severely dealt with, and many of them feeling discouraged and beaten would throw up the sponge and leave their business if they could, but fortunately for the country and ultimately for themselves, most probably, they cannot do it. A fellow told me the other day he did not believe a man could sell a corner lot in heaven and get real money for it; so the farmer today stands a very poor chance to unload.

The fruit grower too, has had his troubles. Almost prohibitive freight rates, coupled with low rates of foreign exchange, and excessive labor costs, conspired during the past year to cause considerable loss to most orchardists, and the future looks none too rosy to any of us. Now the East comes forward and says she will put us out of business in time, because there is less freight to pay to the principal markets, and, further, because she has learned to adopt some of the western progressive methods. I do not take these boasts of the East with seriousness, however, because I have lived there and know she must reconcile herself to the loss on the average, of two crops out of five, by reason of frost alone. She will have to improve her climate before she puts us out of business. Further, her fruit growers will have to stand together in marketing their products much better than they have thus far given any indication of doing, before the East will be able to dictate to the Far West.

In proof of the fact that the East is not surpassing the Pacific Coast section, and will have to hurry for some time to do it, I will present these figures:

Apple Trees in the United States

No. of trees in bearing.		No. of trees not bearing.	
1910	1920	1910	1920
15,352,840	115,265,029 25% loss.	65,791,848	36,171,604 45% loss.

Peach Trees

94,506,657	65,654,921 30% loss.	42,266,243	21,623,657 50% loss.

Apple Yield

1914	1918	1919	1920
253,200,000 bu.	169,911,000 bu.	153,238,000 bu.	240,442,000 bu.

1921
109,710,000 bu.
(Falling off)

Peach Yield

54,100,000 bu.	64,097,000 bu.	34,138,000 bu.	43,679,000 bu.

33,195,000 bu.
(Falling off)

Pear Yield

12,086,000 bu.	11,216,000 bu.	13,281,000 bu.	17,279,000 bu.

9,665,000 bu.
(Holding their own)

Oregon Fruits and Nuts

Tree Fruits of Bearing Age

Total number of trees			Quantity in bu.	Value
Fruit	(1909)	4,583,735	4,423,244	$3,339,845
	(1919)	7,854,006	10,649,427	17,151,425
Nuts	(1909)	16,902	177,632	13,208
	(1919)	92,251	492,142	123,062
Small Fruits		Acres	Quantity in quarts	Value
	(1909)	5,122	9,348,490	641,194
	(1919)	8,463	18,977,822	2,927,984

It will appear from these figures (A) that the number of trees in the United States both in bearing, and in not yet bearing, with the two fruits mentioned above, have been reduced to a remarkabe extent the last ten years, and it will be noted further (B) that the production of both apples and peaches has gone gradually downward during that time. The surprising thing appears in the census figures of the pear production, where it is shown that the pear in the United States is just about holding its own, or somewhat on the net increase in production. The figures point clearly (C) to the fact that the Northwest is producing now more than it ever has before, that it has had a remarkable increase both in the number of trees and in the quantity of production as well. The small fruits have now attained a magnitude to put them among those fruits now ranking first in the western part of this State and Washington.

Some may see in the above figures not permanent prosperity, but rather future overproduction with aggravating financial conditions and other disappointments. Let us look the matter squarely in the face and see what degree of hope there may be in the situation. Whether we win or lose will, in a large measure, depend upon ourselves. Periods of adversity are noted for industry, careful thinking, frugal living, and the development of community and cooperative spirit. Possibly the hardships we are now enduring may be blessings in disguise. They will surely be if they induce fruit growers and farmers in general, to act in units along sound business lines for the furtherance of their own ends.

What all the fruit growers are striving to accomplish is to obtain the highest net profits per acre from their crops. The ways of accomplishing this lie along three different avenues; careful orchard and fruit plantation management; dependable marketing systems; and the reduction of overhead costs. To take up some of the problems looming up before us in these different paths of action is the object of this paper.

Varieties of Fruit Farm Management

One of the problems that arises to vex us is that of profitable varieties. Investigations carried on for ten or a dozen years have shown that the commercially profitable varieties in the Pacific Northwest do not exceed twenty. And what is more, the varieties that may have succeeded best in one section are not at all profitable in another. It may be the factor of color, size, tenderness to cold, altitude requirements, soil requirements, or what not that makes the difference between profit and loss. In a country so newly planted, commercially, as this has been, we are confronted continually with these misfits, and what we are to do with these lusty, well-grown trees, canes, or vines, constitutes one of our serious problems.

In case poor varieties of bush fruits have been planted, the only remedy is to remove them and after a year or so, plant something that has been tested out in the community or at the State Experiment Station. Grapes may be top worked much like fruit trees with a saving of the root systems. Top-working fruit trees either by grafting or by budding seems on the face of it, a relatively simple matter, in spite of the fact that many fruit growers do not understand the operations, but, as a matter of fact, such action is fraught with considerable risk. The wounds made in grafting are often infected with heart rot in Western Oregon and Hood River, especially, with the result that the tree soon breaks down under a load. At the present time, it is doubtful whether the protection of the cleft has developed to the point where it is safe to recommend the practice of cleft grafting on a commercial scale. Investigations should be undertaken as soon as our time and finances permit, to produce some successful method of anticipating such wounds. Until this is done, our poor varieties are apt to stay with us.

Red Apple Needed

Perhaps it may be well to state at this time, the Department of Horticulture of the State Experiment Station has been hunting for a deep red apple for the Willamette Valley and Western Oregon in general. Several years ago several hundred seedling apples were planted at the Station. These have begun to fruit and one variety bids fair to be a fine red and a long keeper. Another variety introduced from Ohio, has every indication of being an excellent sort for this part of the state. This is the Red Rome. This has been introduced to the trade from eastern Washington and brings higher prices than the ordinary Rome.

Yields

Up to the present time, most of the orchards of Western Oregon have been young and we have not realized the importance of maximum yields. At Hood River and in other fruit growing districts of the Northwest, this is coming to be very seriously considered. In the series of Farmers' bulletins of the United States Department of Agriculture covering Hood River, Western Colorado, Wenatchee, Payette and other districts, the factor of yield is considered as having a most important bearing upon the question of profit or loss. Mr. Gordon G. Brown, Horticulturist of Hood River Branch Experiment Station, has recently finished the compilation of some very interesting figures.* In a list of eighteen commercial varieties, the Newtown, the variety planted most widely there, was last in point of yield with Spitzenburg next highest. He shows that the growers obtaining the highest yields produce them at a cost of nearly 3 cents a box less than the cost of growing the smaller yields. The gross returns per acre for the group of orchards showing the highest yields, were more than double the returns from the lowest of the three groups described.

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*See Oregon Station Bulletin 181—Hood River Apple Orchard Management with Special Reference to Yields, Grades, and Values of Fruits.

The contrast between the yields of different varieties as given by Brown is still more striking. The average age of the orchard is fifteen years.

	Bu. per A.
Winesaps	736
Delicious	710
Red Cheek	500
Ortley	400
Winter Banana	385
Jonathan	376
Arkansas Black	322
Spitzenburg	256
Newtown	238

While these figures would seem to indicate a difference so wide that it would be impossible for the Newtown to catch up with the Winesap, such is not the case when the Newtown is grown under proper conditions. Dr. Kloeber of Yakima, for instance, is growing Winesaps and Newtowns side by side in a country where the Winesap is considered the leading variety and a splendid bearer, and is producing more Newtowns per acre than Winesaps off of trees about the same age. He obtains his remarkable results by the application of stable manures, cover crops, commercial fertilizers, careful irrigation, and a system of pruning especially adapted to the Newtown.

In my judgment, high yields of fruit in Western Oregon, no matter whether of tree or vine, will in the future be directly associated with a careful conservation of the water supply in the soil, coupled with a fertility and humus content of the soil to meet the needs of the crop and of the plant that produced it. And, in addition, the finer points of the pruning game must be known so that the peculiarities of each variety may be met and strong fruit buds and well colored fruit be the result. Right now we should like to know with certainty how to improve the setting of the fruit on the Anjou pear. The solution very likely lies in a proper understanding and balancing of the three factors I have mentioned above. There are other problems of a similar nature that occur to all of you.

Clean Fruit

We are well aware that the trade demands large clean fruit and we must spare no pains in pruning, spraying, and thinning to grow such fruit. At the same time we must remember that protection of our trees against disease is even of more vital importance.

Sound Trees

In addition to fire blight, bacterial gummosis, anthracnose and several other serious diseases, the great freeze of December, 1919, dealt a blow to the health of our trees that will long be remembered. Many fine trees that have seemed to recover from the freeze, will succumb in the next few years to a loss spectacular but fully as dangerous an enemy—heart rot—unless help is given them speedily. Orchardists that have not already done so are urged to protect the trunks and limbs from infestation by heart rot. This may be done by first removing the dead bark and then painting the wood with Bordeaux paint. This paint may be most easily made by mixing dry powdered Bordeaux mixture with enough water to form a thick paint. In some cases it may be possible to bridge graft over the exposed surface. This will do much to keep the top and roots in a vigorous condition.

Farm Machinery

One of the greatest factors that has led to economy in fruit farm management has been the introduction of improved farm machinery. The spray machine and spray gun have so increased the capacity of one man's work that he can do in one day as much as two or three men used to do a few years ago with poorer outfits. The latest addition to our list of improved machinery is the tractor with special tools for cultivation constructed for it. Certain types of tractors are now especially designed for the orchardist and they have been the means of cutting down his operating costs in many cases very considerably. According to the tests put on by the University of Illinois, it was found profitable for a man to purchase a tractor when by so doing he could reduce the number of horses on his place by at least 20 per cent. In many orchards all over the Northwest the tractor has reduced the horsepower required well over 50 per cent, by making it possible to handle the peak load of cultivation which comes in early spring, expeditiously, and before soil conditions have become too dry. The question has been asked the writer a good many times as to how large a fruit farm will justify the purchase of a tractor. Obviously conditions of soil, rainfall, drying winds, experienced tractor labor and other factors make it impossible to lay down any specific rule in this regard. I have had several good berry men tell me that ten acres of loganberries or raspberries would justify a man in purchasing one of the cheaper tractors. There is little doubt that in most cases the man with 40 acres or more in orchard trees will cut down his operating expense considerably by the use of a tractor. One very important thing is to be remembered, however, and that is that one should get a tractor with power sufficient for all the needs of the orchard but without excess power. Many large tractors have been discarded by orchardists because the conclusion was finally reached that the power which could be used to advantage in plowing with a gang plow is more or less wasted when hooked up to a lighter disc or harrow. So it has come to be a rather general rule on some of the large fruit ranches in California, Washington and in this State, to use batteries of smaller tractors rather than to have a single large one. Usually the cost of operation and repairs is greatly lessened in this way.

Orchard Costs

By overhead is meant in a strict sense, such items as interest on investment; taxes; insurance; depreciation on buildings, equipment, horses, and the like; interest on loans, etc. In so far as any policy of farm management distinctly touches any of these factors it may be said to come in the category of overhead costs.

Diversified Fruitgrowing

From this viewpoint I wish to present briefly the subject of diversified fruit farming because it ties itself up directly with such matters as value of the investment, interest on loans, taxes and so on.

In the Pacific Northwest where climate and soil have done so much for us and where land values are considered by some to be rather high. it is not only our privilege to grow many kinds of fruit, but it is usually to our economic advantage to diversify to some extent and to do the work in an intensive way.

Much as the cotton farmers of the South have come to see that a more diversified agricultue is necessary for their prosperity, so we fruit growers are fast coming to realize that the man of average means is much safer financially if he can realize something on several fruit crops than if he has all his returns for the year tied up in one. While specialization is necessary within reasonable limits, the man who diversifies within his specialty so to speak has enough knowledge of the game to do thorough work and, at the same time, has a more flexible and stable form of management.

In all cases of diversification a thorough knowledge of what the soil and climate will produce must be held by the grower; his personal likes and dislikes must be considered; and a careful planting plan must be followed in order that a proper sequence of such orchard operations as pruning, spraying, and picking may be obtained. If the plan is carefully drawn there will be very few "peak loads" in labor of all kinds. It will be possible to do most of the work with a few good men hired the year round.

The most important result of diversification, however, is undoubtedly in giving the fruitgrower ready cash with which to finance himself at various times during the year and thus to relieve him from borrowing money from his local bank for operation costs. In this way the scheme has a direct bearing upon the overhead factor of interest. Then diversification successfully carried out means increased sales value to the property because it enables the owner to make a larger per cent of interest on his money invested.

Cost Accounts

I cannot leave the general subject of overhead costs without entering a plea for careful cost accounting for every fruit farm. There is probably nothing that hurts the business of the progressive fruit grower more than to have another grower who does not know what it costs to produce a commodity compete with him on the open market. When farmers are selling their produce below cost or on too narrow a margin of profit they demoralize the market, ruin their chances of a profit that will enable them and their families to enjoy the comforts of life, and ultimately, lower the value of their property investment to a very considerable degree.

So much attention has been given to simplified forms of cost accounting by the Extenison Service of the Oregon Agricultural college during recent years that there is no good reason why an enterprising fruit grower should not have this information and profit by it.

The Pressure Test—Harvesting and Marketing

The first thing I will call your attention to is the need of determining accurately the time of picking tree fruits, especially pears, apples and peaches. In one case that came to my attention this fall, the manager of one of our largest pear orchards was advised by a man of large experience to pick his Bartlets at once. He had heard of a new testing machine in use at the Experiment Station and so investigated the matter. He was advised, after several of his pears had been tested, to hold off picking a week or ten days. He did so with the result that the pears gained 24 per cent in weight in nine days and when shipped, arrived in New York in excellent condition. This new test is based upon the pressure required to puncture the skin and flesh of the fruit to a certain depth. We have worked it out quite accurately for most of our varieties of commercial pears, but considerable work must still be done on apples and peaches before pressure curves can be drawn. The machine we have is a large one made for laboratory work, but it is hoped a smaller machine suitable for carrying about in the orchard will soon be constructed on a commercial scale.

Wiping Fruit

Another marketing problem we may be called upon to investigate in the near future is related to the wiping of fruit. Will fruit wiped with canvas gloves keep as well as fruit wiped by hand, or fruit that is unwiped? In other words, with the slight scratching that is sometime produced by rubbing and removal of some of the waxy covering cause the fruit to decay quicker.

Co-Operative Marketing

To the grower of fruits in the Pacific Northwest so far removed from most of the markets, some sort of a co-operative agency which will return to him all that is left after costs of sales have been met, seems to be a marketing necessity. It may be true that some men especially gifted in salesmanship may on the average procure more for their fruits than will a carefully conducted marketing association, but even if, under favorable circumstances, this be true—and it does not often hold that way—still the fruit grower that markets by himself may be losing money if he considers the time he takes in selling and the neglect his farming operations must suffer in his absence.

This is a phase of co-operative marketing that has not been emphasized enough in my judgment. Personally, I had rather take 5c less a box, if necessary, placing my apples in the hands of an experienced and competent cooperative sales agency, and then having my time free to look after the needs of my orchard, than to attempt to place my fruit upon the market as an individual.

Another thought I wish to bring out, even at the risk of being called an impractical professor, is that we should have some way of closer approach to the consumer. If Swift & Co., and the other packers can have their distributing stores where their products are sold to local butchers, grocerymen, restaurant keepers, and so on, why would it not be possible for a cooperative growers association, such as the Oregon Growers', to establish stores and distributing centers of some sort in our largest cities from which our products may be easily and evenly distributed to the retailers. There will come a time, in my judgment, when this will be carried a step farther and fruit will be sold to the consumers' agent, but that will only be when the consumers themselves form purchasing associations, much like the Rochdale system in England, and buy their fruit directly from the producers selling agency.

These as I see it, are a few of the important problems the fruit grower is facing today.

Pres. Pearcy: If there is no discussion on the paper just read, we will have the next number on the program which is a very important paper by Mr. Chas. A. Parke.

THE PURPOSE OF PLANT QUARANTINES

By Chas. A. Parke, President Oregon State Horticultural Board.

Gentlemen: I take it from the topic assigned to me on the program that I am to discuss plant quarantines and give some reason why plant quarantine regulations are necessary. In discussing the subject of plant quarantines, I shall be confined largely to the purpose of the quarantines and not take up other phases of the problem.

The purpose of a quarantine has not changed since 1448, when the two-score or forty-day period of detention of ships and men was designated by the quaint old term of quarantine, and a code of laws drawn up to authorize its enforcement. That quarantine was to hold back and prevent the introduction of disease that attacks mankind. The application of this principle has been broadened to meet new conditions and requirements, but the same fundamental purpose remains as of yore, namely, the prevention of the spread of disease.

In the application of the quarantine principle, to matters of peculiar interest to this society, we may state more specifically that horticultural quarantines have for their purpose the prevention of any further increase in the cost of crop production, that might otherwise result from the introduction of new and dangerous insect pests and plant diseases.

It was not many years ago that apples grew to perfection in the Willamette Valley with little care and at low cost of production. This was before the codlin moth, apple scab and kindred apple troubles had found a lodgment in the Willamette Valley. Since the coming of the codling moth and the injurious fungus diseases into this once clean territory, you may properly ask, "What is the cost of a perfect apple today?" I will answer this question in two ways:

First: The modus operandi necessary to produce the fruit.
Second: The cost in dollars and cents.

The modus operandi consists of:

Dormant spray of lime and sulphur.
Pre-pink spray for scab.
Pink spray for scab.
Calyx spray for scab and codling moth.
Then ten days later spray for scab.
With your weather eye out be prepared to spray later for scab.
In June spray for codling moth.
Repeat this spray three or four times until the apples are carefully boxed.
Shake well before taking.
By the way, don't forget to spray in the fall for anthracnose.

Doesn't this remind you of a few lines in Anthony Euwer's poem entitled, "The Blood in the Apple."

> You city folk—who night and day
> Loiter and stare along Broadway,
> And pausing by some fruiterer's shop—
> You city folk—do you ever stop
> To count the cost of those radiant wares,
> Spitzenbergs luscious and Anjou Pears,
> Winter Banana and Gravenstein,
> Crimson and gold in their sun-washed sheen?
>
> You city folk—that fruit you see—
> It wasn't by chance, you take it from me!
> Just reckon these when you count the cost
> Of that wonderful fruit you saw today,
> As you stopped by the window along Broadway.

The cost in dollars and cents:

I have some estimates which indicate the extra cost which is added to the care, anxiety and skill in applying methods of control.

There are approximately 270,000 pounds of arsenate of lead used annually in Oregon for the control of codling moth. At 26 cents per pound brings the cost for material to $70,000. The item of application including upkeep and depreciation on machinery will amount to $25,000 annually. A conservative estimate of losses per annum on fruit due to codling moth, for the state, amounts to $375,000. Adding up these items, we find the codling moth, an introduced pest, costs us in Oregon anually $470,000.

Another introduced insect pest is the elm leaf beetle (galerucella cuteola). The seriousness of this pest caused the professor of landscape gardening at the Oregon Agricultural College to remark. "I will not recommend the planting of another elm tree in Oregon."

The elm leaf beetle introduced in eastern United States in the vicinity of Baltimore about 1834, has spread south to North Carolina, north to Massachusetts and west to Kentucky and Ohio. It was introduced into Oregon some time previous to 1915. About 2000 young elm trees in Laurelhurst Addition in Portland showed serious injury that year. The beetle has since spread fairly well throughout the state and its serious defoliation of elms with subsequent unsightly appearance of the trees is well known. The eventual result of the work of this pest will be the destruction of this beautiful tree. The pest undoubtedly was introduced into Oregon in bundles of clothing, household furniture, or in packing about young elm trees.

The asparagus beetle (crioceris asparagi) was introduced into the trucking section near Portland in 1919. It has already spread to nearly all of the asparagus plantings adjacent to Portland, and down the Columbia River. It is a serious pest and difficult to control. It will limit the production of asparagus to the few who are willing to put up the fight to control. Result: Production curtailed and cost increased all due to the activity of this little pest.

We have these aforementioned pests and many more to remind us that "man must earn his bread by the sweat of his brow." There are other pests we have not as yet and we wish to keep them back as long as possible.

In the summer of 1921 the Colorado potato beetle found a lodgment in Benedictine Heights in Portland. The infestation was discovered in June and immediately the work of extermination was started. Much praise is due the Multnomah County Commissioners for their vision and quick action in this matter. They made it possible to immediately spray the infested gardens on the few city blocks with arsenite of soda and thus killed all insects and vegetable life with which the spray came in contact. Extra men were put to work, who for two months scouted the territory within the radius of a mile of the infested spot. They went over this territory many times and visited the particular gardens every day to mop up any Colorado potato beetles found. The work was continued at least two weeks after any beetle was found. We went in with the determination of exterminating the pest this year and not with the idea that we will get the most of them this year and then finish up next year. The smaller the infestation the easier the extermination. There are enough of us from the east who know what it means to go through the potato patches with cans containing soft soap and water to gather up the potato bugs, and we can make our own estimate of what this pest would add to the cost of the production of potatoes in Oregon.

The brown tailed moth has been intercepted a number of times on apple seedling nursery stock shipped from France to Woodburn, Oregon. A most serious pest which found a lodgment in the state of Massachusetts through accident. The state of Massachusetts has spent millions of dollars trying to control this pest meeting with little success.

What consternation there would be among the prune growers of Oregon if they should wake up some morning and find that a new insect pest had taken up its abode in their orchards; that the cost of production had been increased by one-fifth to one-third and that the amount of crop produced had been decreased by one-third to one-tenth. They would post haste send to the experiment station for assistance, telling the entomological department that a strange insect is in their orchards, that cuts the skin of the fruit and deposits its eggs within the flesh of the same; that the eggs hatch out into worms rendering the fruit unfit for food.

True to form, the grower would get the reply that he has the plum curculio (conotrachelus neuphar); a native pest of eastern United States, which occurs generally east of the Rockies, causing an annual injury due to egg punctures, feeding, mechanical injury and subsequent entrance of rot spores estimated at eight millions of dollars annually.

Gentlemen, we do not have this pest in the western states and we want to keep it out as long as possible. To this purpose we must look to quarantine measures and the officials to enforce the same. In the matter of plant quarantine, each state is sovereign to itself, but in the practical working out of our problems we find it advantageous to cooperate with our sister states in order to protect ourselves best from the insect pests and plant diseases we do not have.

The carefully considered and diligently enforced plant quarantine orders issued by Pacific Coast States up to date, have, in a large measure, resulted in keeping the fruit and melon flies out of our orchards and truck farms; in keeping the gypsy and brown-tail moths out of our forests and the blister-rust away from our five-leafed pine trees. The Oriental peach moth now well established in other sections of the United States has been kept out of the orchards of the Pacific Coast by the application of close quarantine inspection, and the same may be said of the Japanese beetle. The ravages of the Chestnut bark disease, the eastern Filbert blight and the European corn-worm, peach yellows, together with the restrictions they cause to be placed upon these crops are things we read about in the official publications of some of the eastern states, but thanks to the effect of plant quarantine the producers have no actual experience of these virulent crop pests upon the Pacific Coast. The Mexican cotton-boll weevil and the pink bollworm of cotton—both introduced insect pests—in addition to greatly reducing the annual output of this staple, are causing the issuance of the most drastic and far reaching federal and state laws, rules and regulations directed against the cultivation and movement of the cotton plant and its various products. The cotton fields of the Pacific Coast states are clean and free of both of these pests, and also free of the burden and loss that would surely follow their introduction and establishment. The sweet potato weevil has not as yet become established on the Pacific Coast, yet the pest is a regular immigrant and a common acquaintance of the quarantine inspector. The potato wart disease still remains, with one exception, in its native habitat, and finally our knowledge of the citrus canker, the most destructive scourge of the citrus industry, is still confined to what we read in the official bulletins of the state of Florida.

All of the above mentioned crop pests except the fruit flies have become well established in the United States east of the Rocky mountains, and were introduced into that territory before the adoption and enforcement of plant quarantine regulations by the several states concerned. Not one of the above mentioned crop pests has become established in the Pacific Coast states, yet since the inauguration and enforcement of plant quarantine regulations on this coast many of these crop pests have been repeatedly intercepted in imports of plant products and destroyed by the local plant quarantine inspectors.

The true value of plant quarantine to the crop producers of the Pacific Coast can be summed up in the following simple sentence. The present unchallenged entrance of our crop products into the markets of the world. Such an enviable condition is by no means common to the crop producers of the world at large, in fact it constitutes a very rare exception.

Consider the alternative. The markets of the world promptly closed to our entire fruit crop. The introduction and establishment on the Pacific Coast of the Mediterranean fruit fly would be sufficient cause to create such a situation. If this omniverous pest should gain an entrance, either by accident or laxity in enforcing quarantine regulations, every fruit growing state in the Union and all other fruit growing countries would promptly apply, in fact would be compelled to apply, for their own protection, the same prohibitive regulations against the importing or bringing into or through their territories of all of our fresh fruits, as are now in force and enforced against the territory of Hawaii and other countries infested with this pest.

Any serious contemplation of the possibilities of evil or loss that would promptly result from the establishment of the insect pests and plant diseases enumerated in this address, in the farms, forests and fields of the Pacific Coast, should be preceded by a thorough acquaintance with the actual financial loss to the crop producers of the countries in which the same have been permitted to gain an entrance and establish a residence. The natural deductions from such a study would, we believe, bring about a clearer, better recognition of the value of efficient quarantine work and a concerted determination to maintain, develop and support the same.

Pres. Pearcy: Is there any discussion to follow this paper?

Mr. Forbes: Is anything known about a worm that attacks the filbert?

Mr. Parke: I do not know. Prof. Lovett might answer your question.

Mr. Forbes: Orchards have been attacked seriously and a large portion of the crops was destroyed. Something ought to be done and an investigation should be made. I wish to call the attention of the Horticultural Society to that fact.

Mr. Parke: Mr. Lovett, do you know anything about it?

Prof. Lovett: I have found it in the native filbert and I have wondered if it might not find its way to the cultivated filbert. I cannot say much about the life history of it. The moth is similar to the Italian one. I am interested to know. There is a fungus trouble with respect to the filbert that occurs in the east generally. Hence, eastern filberts are not good to have in the west. Keep out the bad things that we do not have here. Do not bring the bad things in here.

Mr. Forbes: There is some kind of purple gum on the outside of the filbert. It does not affect the kernel of the nut. It eats into the shell and mars the nut but does not get into the kernel.

Prof. Lovett: That same thing is in the wild hazelnut.

Pres. Pearcy: I would like to appoint committees at this time. I will appoint on the Resolutions Committee Col. H. E. Dosch, chairman; Mr. Holt and Mr. Brown.

The Committee on Legislation is a standing committee consisting of Chas. A. Parke, Robert C. Paulus, Mr. Bailey, A. C. Allen and L. T. Reynolds.

The Auditing Committee will be the same as last year, Albert Brownell, C. A. Burt, and J. B. Pilkington.

Immediately following the next paper, we will hold the election of officers. The next paper is "Die-back of the Loganberry," by Dr. Zeller, Associate Pathologist, Oregon Agricultural Experimental Station.

DIE-BACK OF THE LOGANBERRY

By Dr. Zeller, Associate Pathologist, Oregon Agricultural Experiment Station.

During the months of February and March this year the Department of Botany and Plant Pathology at the Oregon Experiment Station began to receive specimens of die-back of loganberry plants and inquiries concerning the death of the fruiting canes. Some of the growers were becoming discouraged to find that many of the canes which should produce this year's crop were apparently dead so early in the season. During April these inquiries had flooded our office and first-aid calls came from various localities until it was necessary for members of the department staff to go into some of these localities to learn if possible the cause of this trouble.

Professor Barss answered a call to Tillamook county. Professor Brown, of the Department of Horticulture, and the speaker made a trip through some of the fruit growing districts of Benton, Polk, Yamhill, Washington, Multnomah and Marion counties, and Professor Long and myself made a special trip to some of the larger loganberry plantings near Salem and Newberg.

The condition among the loganberries was much the same in all of these districts. As a usual thing we found a very considerable evidence of the dying back of the canes, usually from the tips, but sometimes the portion toward the end was seemingly in good condition while a portion of the cane nearer the hill was dead. In comparatively few cases did the entire hills seem weakened as evidenced by the vigorous growth of new canes.

The appearance in the field in May and June was very much like the specimens which had come to the office during the earlier spring months. The fruiting canes were dead from 1 to 4 feet back from the tip. Sometimes most of the buds on these ends were dead but one or more were making some kind of growth. Examination failed to disclose any very definite evidence of disease lesions, there being few examples of such death back toward the base of the canes. Usually however, on canes showing die-back there would be found a hard and dead condition of the outer bark of the canes at the ground and possibly extending up on the cane for one foot or farther, sometimes extending to the totally dead portion at the tip. The outer bark was often cracked and roughened, sloughing off to some extent especially at the crown and just above. As early as the middle of May the underlying bark layers and wood seemed to be in perfect condition in the lower portion of the canes, even in badly affected cases.

In the plants least affected by this die-back the fruiting canes show vigorous green or reddish green outer bark back even to the crown. In such cases there was no heavy dead outer bark layer and practically no cracking or roughness. Such healthy fruiting canes are not very common in yards where the die-back exists.

This type of die-back in the canes of loganberry was found under all sorts of conditions as relating to soils, exposure, fertilization, care, moisture, drainage, etc. Usually the trouble is worse where the care has not been of the best or where drainage was evidently poor, but in some yards where soil and care were ideal much of the die-back was found.

Many of the specimens which were sent in to the Experiment Station were attacked by the gray bark fungus (Mycosphaerella rubina) which has been found in some of the Eastern states. In some years this is considered a serious disease of the raspberry in Colorado and Minnesota where it appears as a bud blight and renders the canes extremely brittle. At first we thought that this might be the cause of the death and brittleness in the loganberry but in our survey we were unable to find this fungus consistently associated with the trouble. The bark of affected canes was more often brown than gray, although there was considerable grayish bark here and there—not uniformly enough, however, to be highly suspicious. This does not exclude the fungus from a possible relation to the trouble for it may be that the symptoms of Mycosphaerella on loganberry under Oregon conditions are different than those usually described for this organism. We doubt, however, that this fungus is of very great importance in the culture of brambles in Oregon.

The die-back of woody plants is often attributed to low temperatures during the winter and the die-back of loganberry in question does not differ materially in appearance from winter injury. Freezing, however, cannot be considered as the cause of the trouble so severe this year for in those localities in Oregon mentioned above the temperatures during the past winter were not low enough to injure loganberry canes, as will be pointed out in a moment.

During the survey of conditions to which the canes had been subjected during the fall and winter months we found that all those growers in whose yards we observed the dead canes had not trained up their vines until spring. Thus, at least the ends of these canes lay on the ground very close to it during the fall and winter, which seasons were especially moist this year. Probably, then, that portion of the canes lying in these moist conditions became devitalized and perhaps attacked by some fungus or possibly by many fungi or bacteria which are usually less harmful. Apparently, in some such way, the vitality of the canes and buds was destroyed under the very prolonged damp conditions of the past winter which seemed to favor much more of this die-back than usually would occur.

Concrete evidence was found to show that leaving the canes down during the fall and winter caused the deaths of the bearing canes. One grower near Gervais, Oregon, had two yards of loganberries planted on the same type of soil and under the same conditions as to drainage, exposure, etc. Both yards had received the same care with one exception, that is, one yard was trained up in the fall, the other, because of lack of labor and favorable weather conditions was trained up in the spring. The yard in which the canes were trained up in the spring showed the die-back to such an extent that the crop could not have been more than from 10 to 15% of a normal yield. The yard in which the canes were trained up in the fall had no evidence of the die-back condition except in places where the posts had broken over, allowing the canes to touch the ground. These places were marked by new posts, next to which the dead canes were as numerous as in the spring trained yard. In previous years when both yards were trained up in the fall the one showing the die-back this year has been slightly the greater producer.

Near Newberg there are two large loganberry plantings belonging to one grower who has practiced fall training of the canes for a number of years. His yards are free this year from die-back except about one-half of a row which was left at the end of the last day of training in the fall. This portion of a row was left down until early spring and it has die-back of the canes although not to the extent of that found in many yards.

The splendid condition of the plants in these yards in which the canes were trained up in the fall, bear evidence to the fact that the die-back is not due to the effect of low temperatures or winter injury as it is usually called. Even though they passed the winter trained up on the wires, they show no die-back.

But knowing the susceptibility of the loganberry to very low temperatures, naturally, the question arises as to whether too great risk of freezing in our climate is not taken by fall training. I will answer this question by citing again the two growers mentioned before. Both of these growers have practiced fall training for several years. Both experienced almost total loss of the 1920 crop due to the low temperatures of December, 1919. Still both continue the fall training believing the benefit to outweigh the damage. One of them says he could experience a total loss of his crop once in five years and get better returns from the remaining four crops than will the grower who practices spring training obtain from five crops.

Of course, it would be absurd to recommend fall training of loganberries for those districts where low winter temperatures are the usual thing, but in localities where the winters are wet and the temperatures are mild, as is usually the case in western Oregon, fall training for the prevention of die-back would seem to be a very desirable practice.

Member: How much difference was there in production?

Dr. Zeller: I haven't had the results from this grower on the production.

Pres. Pearcy: Are there any further questions?

The next in order of business will be the selection of a site for our annual meeting next year.

Mr. B. W. Johnson: I have an invitation to present to the Oregon State Horticultural Society meeting at Forest Grove, Oregon,

Prof. Long: We think that the Horticultural Show could be combined with this Horticultural Society meeting. At present, the show is held four weeks later than the Horticultural Society meeting. We believe that the Horticultural Show of Oregon Agricultural College is the best in the country. It is an education in itself. We would insist upon moving this meeting forward two weeks and moving the Horticultural Show back two weeks.

Pres. Pearcy: I see no objection to that.

I had a telegram from Dallas to invite the Oregon State Horticultural Society to Dallas. We have these two invitations. What action shall we take?

Member: I move that the next place that we meet shall be in Corvallis.

Motion carried.

Pres. Pearcy: Corvallis will be our next meeting place. They have extended us a hearty welcome. We can arrange dates with the Horticultural Show.

The next order of business is the selection of the next president.

Mr. Minton: I move that when we adjourn, we adjourn to meet in the office of the Secretary, 318 Chamber of Commerce building, Portland, Oregon, on Monday, December 5th, 1921.

Motion carried.

Pres. Pearcy: The next order of business is the selection of a president.

Prof. Long: I nominate B. W. Johnson.

Prof. Brown: I move that the nomination be closed and a unanimous ballot be cast for Mr. Johnson.

Motion carried.

Mr. Minton: I cast a unanimous ballot for Mr. Johnson as president of the Oregon State Horticultural Society.

Mr. Johnson: Is this a free job? I thank you for this honor and will endeavor to make good. I invite all you men to have an apple from my apple display.

Pres. Pearcy: Nominations are now in order for vice-president.

Mr. Brown: I nominate E. A. Reuter.

Member: I move that the nominations be closed and a unanimous ballot be cast for Mr. Reuter.

Motion carried.

Mr. Minton: I cast a unanimous ballot for Mr. Reuter as vice-president.

Pres. Pearcy: Mr. Reuter is the best fruit grower in Washington county.

Nominations are in order for secretary-treasurer.

Mr. Parke: I nominate Mr. C. D. Minton.

Member: I move the nominations be closed and a unanimous ballot be cast for Mr. Minton.

Motion carried.

Pres. Pearcy: Mr. Minton is elected secretary-treasurer.

We have one trustee to elect this year to replace Senator McNary. Senator McNary is retiring according to tenure of office this year.

Mr. Minton: While Senator McNary has not been very active in this position, this position gives him considerable eclat in Washington, D. C. Therefore, I move that he be renominated for this position.

Motion carried.

Pres. Pearcy: Senator McNary is unanimously elected as trustee.

We will now have the report of the Committee on Legislation.

Mr. Chas. A. Parke: The last legislature of this state brought forth this measure on grading and packing laws for pears. This is on the statute books and in the records of this state. We should like to make the laws of the northwest uniform so that the easterner can know what he can get. There is no difference between Washington, Idaho and Oregon apples and we should like to have the same laws regarding sorting into sizes, grading, packing them, etc. The bill against using berry boxes more than once was knocked out and killed. This would have been very expensive for the berry grower.

Mr. Weatherspoon: Mr. Chairman: May I ask Mr. Parke a question? What about appointing this commission to tax fruit lands? What does that mean?

I am ignorant and I would like to know if you can give me some light.

Mr. Parke: The Governor has appointed a commission for raising revenue by the income tax. This is all up in the air as yet.

Mr. Weatherspoon: This information came to me in a letter from the Secretary of the Ad Club from Union county only four days ago. They asked me to give my opinion on the matter. Is there any reason why fruit lands should be taxed any more than wheat lands? For one hundred acres of wheat a man has to spend only two hundred days of actual work on them while for the same amount of orchards a man must work every one of the three hundred and sixty-five days in the year. My recommendation is that my land should be taxed the same as my neighbor's, whether the land is in wheat or orchards or what.

Mr. Parke: I do not know anything about it except as I said before.

Mr. Anderson: I wish to express my opinion on this matter, too. This is the way my place and the three adjoining places are taxed. One is taxed fifteen dollars per acre; another fifty dollars per acre; another ten dollars per acre; and mine is taxed one hundred and forty dollars per acre. The third place is partly orchard, and my place is orchard but the rest are in wheat. Wheat land is less work. If they took off taxation on young orchards it would be all right but they tax the young orchards the same as the old orchards. It seems unbalanced.

Mr. Weatherspoon: I believe that this matter is worth looking into. The letter seems original. This vitally concerns this society. Let us bring equal and just taxation. The stock man and the wheat man think the orchard man should not exist. Hence, the orchards are taxed very high. I believe that this society should take up the matter immediately and investigate it. My letter came in connection with this commission business. I believe that someone should go to Salem.

'Prof. Long: Oregon Agricultural College has been called upon by this commission to take records of actual production with all costs included, on several hundred farms in the state including grain farms, live stock farms and fruit farms. Also, the University of Oregon is to make a similar survey on the industries of the state. This work will fall upon the research and county workers. We ought to get in touch with the county agents and help them to get their reports.

Mr. Brown: There is a wide difference in assessments. Those who have farm loans from the government know that they do not think it permanent. They think of it as changing crops. They treat land as land. Let us tax land as bare land and make all lands equal.

Mr. Forbis: Orchards go in as improved lands. They call all lands improved lands. It is a matter of statistics, not taxation.

Mr. A. C. Allen, (of Medford, Oregon): In the Rogue River valley they soak us to the limit—seven hundred and fifty dollars an acre.

Mr. Minton: You soak us three thousand dollars when we want to buy.

Mr. Allen: We want a little additional tax on our trees because we want fruit inspection in thousands of dollars not hundreds of dollars. The county court does not want to pay this. They assess or tax us so much to run our orchards. We want the assessments to cover inspection, county roads, etc.

Prof. Long: Is your county court taxation on fruit lands the same?

Mr. Allen: No. It is forty dollars an acre for grain lands and seven hundred and fifty dollars an acre for bearing orchard lands. We have the difference in taxation decidedly lessened now from what it used to be, but we are taxed hard enough even so. The land is nothing but land with the crop on it, but the orchard men go outside and bring money into the county. They should be encouraged by taxes.

Member: What is your limit of taxation?

Member: I do not know from actual experience.

Member: Taxes increase every year with the age of the tree.

Member: Regarding Mr. Brown's statement that this is merely the crop, as far as the land is concerned, there is no difference. The crop makes the difference. I should like to have a committee appointed to look into this matter.

Mr. Minton: Write out a resolution to this effect and give it to the Resolutions Committee to report.

Prof. Barss: The Committee on Legislation also got the appropriation from the state for horticultural work to be continued.

Mr. Parke: They have a fruit inspector in Yamhill county.

Pres. Pearcy: We are adjourned until 9:30 Saturday morning when we shall meet in Marsh Hall instead of here in the K. of P. hall. This room is to be used by another meeting tomorrow.

The Commercial Club gave an informal reception during the evening consisting of lunch, music and speech. President Judge W. H. Hallis presided.

SATURDAY, DECEMBER 3, 1921

The meeting was called to order by the President, Mr. Earl Pearcy.

Pres. Pearcy: Prof. Zeller has had his overcoat on all morning, so we will give him a chance to warm up now. Dr. S. M. Zeller is Associate Pathologist at Oregon Agricultural Experiment Station. He will speak to us on "European Apple Canker and Heart Rot in Our Orchards."

EUROPEAN APPLE CANKER AND HEART ROT IN OUR ORCHARDS

By Dr. S. M. Zeller, Associate Pathologist, Oregon Agricultural Experiment Station.

The legacy of susceptibility to certain diseases left by the freeze of December, 1919, has been apparent to every orchardist in Western Oregon. Many trees which showed very little, if any, damage immediately after the freeze have proven their loss of vitality by the ease with which they fall prey to one or another of the diseases to which they are subject. This has been proven to the sorrow of some orchardists by the added vigor with which apple anthracnose has attacked the trees. You will remember that in the spring of 1920 many of the branches had extremely long cankers running for several feet up and down the south or southwest side. These cankers were covered with the typical anthracnose fruiting bodies. Close study revealed that these were frozen spots which had later been attacked by the anthracnose fungus, spreading many times faster in the injured bark than in the healthier parts. This fungus often completely filled the great freeze patches. In addition to such cases it may be mentioned that in many instances where actual frost cankers had not developed, the anthracnose fungus had spread faster than usual and it appeared that it had even spread out from the sides of old anthracnose cankers in a manner never reported before. It is evident then that the great general increase in abundance of anthracnose in the spring and fall of 1920 and even in 1921 is not due solely to the delay of growers in getting on their fall anthracnose sprays, although that had something to do with it, but it was also due to the effects of the low temperatures on the susceptibility of the trees to infection and rapid spread of the fungus.

Anthracnose is not the only offender which seemed to have conditions perfected for its rapid spread by the freeze. I want to call your attention to two other diseases which have become more widespread in Oregon orchards since the freeze than at any time before. One of these is the Cytospora canker of apple and pear and the other the European canker of the same hosts.

During our survey of the orchard diseases in Western Oregon we have found the Cytospora canker to be very prevalent in nearly all apple and pear growing sections, especially in those localities where the freeze of 1919 did damage to the trees. Many of the growers have referred to this canker as being very troublesome and now that winter pruning will soon occupy the attention of the grower it perhaps would not come amiss to describe here this canker and conditions under which it attacks trees.

The canker appears on the twigs, branches and the main trunk of young and old apple and pear trees. If the point of infection is on the smaller branches the canker spreads downward and into the larger branches and trunk. From an infection on the trunk it spreads upward more slowly but may girdle the larger branches in a short time.

The infected bark at first has a reddish discoloration and these areas soon begin to become sunken with a wrinkled skin which peels and splits along the margins. By the pressure of the thumb the skin, or epidermis, can be easily slipped from the bark which is darkened and water-soaked beneath. The margins of cankers are usually marked by a purplish zone much as in the case of a new infection of Anthracnose and this gives evidence of the advances of the fungus into the surrounding healthy bark. Fruiting bodies of the fungus soon appear over the surface of the canker. Mr. Leonian who has recently published an article on this disease in Phytopathology says that the fruiting appears from one to two weeks after the invasion of the canker has been noticed.

Cytospora cankers may be recognized by the character of the fruiting bodies of the fungus which appears on the surface of the cankers. The fruiting bodies first appear as small pimples on the surface. These on close examination are like tiny volcanoes and finally from these small projections are forced out long coils of spores embedded in a gelatinous substance, which sometimes reaches an inch in length. It has the suggestion of some cheesy substance being forced through a pore of a colander. There are evidently three common species of Cytospora on the pear and apple trees of Western Oregon. They have (1) reddish-orange, (2) lemon-yellow and (3) white "sporehorns" or coils of spores. The first of these is most commonly found, but further distinction need not be made between them in this connection for they are evidently about equally harmful. The "sporehorns" are found coming from the bark during the dryer periods of the years and may be found in this condition for some time after the first rains in the fall, but with much more free water on the bark, caused by excessive rains, these sporehorns are washed apart and the spores distributed over the bark surface. If the spores are produced when the atmosphere is rather damp but not sufficient moisture to wash the spores away, globular, amber-colored, sticky masses of spores are found on the opening of the fruiting bodies. These dry down to hard, glassy, dark-red or light yellow hemispheres.

Cytospora gains entrance through pruning cuts but usually through such bark injuries as those caused by the freeze or sun-scald. This canker-producing fungus readily enters and parasitizes a tree which has become weakened by any cause. For this reason the Cytospora canker is a very common occurrence in orchards affected by the 1919 freeze. In several cases apple trees have been seen with all the main branches cankered and the whole tree was withering when in full leaf and fruit. Upon observation of the general lay of the land in such cases, however, one usually finds that the tree has been subject to a possible lack of drainage or some other poor soil condition, or may be the victim of drouth.

Although the canker is limited almost entirely to devitalized trees it is not a disease which should be allowed to run uncontrolled for when access is once gained the fungus does destroy many trees which under adequate care can be brought back to proper vigor. In order to eradicate the Cytospora canker the grower should trim out all "die-back" branches and suspicious dead bark.

The European canker of pear and apple has been known in Oregon since 1918, when Professor H. P. Barss identified the trouble on the Red Cheek Pippin. Since that time specimens of the canker have been sent in from various localities in Western Oregon and one in California.

Among the specimens which have been identified as due to Nectria (the fungus causing European canker) were several cankers on apples, the varieties of which are unknown. The hosts for this canker upon which the fungus has been definitely determined for Oregon are several varieties of apple, namely, Red Cheek Pippin, Bismark and Bellflower; D'Anjou, Howell and Bosc pears; quince; oak, and dogwood. The canker has also been reported on Bartlett pear in Tillamook county but we have not observed this personally.

In Europe and the Northeastern part of the United States the European canker on apple is described as a slow-growing disease which enters the host through some wound or bruise, usually where a small twig or spur has been broken or pruned off, where the strain on the crotches has caused a crack, and through such bruises as may occur by the impact of hailstones upon the bark. It spreads slowly killing the bark as it goes. Each year the bark at the edge of the canker is encroached upon anew by the fungus and is killed, thus causing a new callus to form each year just outside of that of the previous year. As the disease thus spreads over a period of years a number of concentric calluses are formed. The dead bark falls away exposing the wood so that these concentric wood calluses show up conspicuously, giving the entire canker its striking appearance which is characteristic of the open type of canker as it occurs there. This type of canker is reported as prevailing especially on erect, vigorous scaffold branches of the tree, while a closed, rough gall-like canker is characteristic of the horizontal or hanging branches.

However, in the western cankers the concentric arrangement of callus rings in old cankers is much less in evidence and usually cannot be found in most cankers caused by this fungus. For some reason, possibly due to climatic or other conditions not yet fully understood, the cankers spread very rapidly, sometimes extending for several inches or even one or two feet in a single season and remain more or less covered with the old dead bark. One can readily imagine that this continual lateral and longitudinal growth without callus formation can be possible only in a locality where there is a prolonged humid season with moderate temperatures such as usually prevails for several months on the Pacific slope of the Northwest. This perhaps is the reason that we find in Western Oregon these large cankers covering many square inches of bark surface without the conspicuous formation of calluses.

For the most part there is good evidence that infections take place at small, sappy pruning cuts or in crotches. On the Red Cheek Pippin apple and Bosc D'Anjou pears cankers have been observed frequently to start in the crotches of the largest branches. In many instances where there are no pruning cuts there are indications of infection in the crotches of fruiting and leaf spurs, especially through dead spurs. Wherever the bark of the host has become devitalized, through sun scald or winter injury, for instance, the fungus obtains an easy access and from there spreads to the healthier tissues. In some cases it has been found that the fungus has obtained its start in the edge of anthracnose cankers on D'Anjou pear. In an orchard of Bosc pears where nearly every tree has some infections of the European canker there is considerable bark injury due to the freeze of December, 1919. From many of these winter injury areas cankers are spreading with extreme vigor. In most cases of such winter injury both to Bosc and D'Anjou pear, the coral spot disease, caused by a fungus which is a very close relative to that producing European canker, has also gained a foothold and there is much evidence that this fungus although usually saprophytic, exists as a parasite upon partially devitalized bark and wood.

So far as varietal susceptibility is concerned, little information is at hand for American conditions. But the German pathologists, Hartig, Aherhold and others say that growers have always spoken of cankerous varieties. It is held by some of them that thick-barked varieties are more resistant than others. Again, the matter of whether a variety is susceptible or resistant to the disease is said to depend directly upon its susceptibility or resistance to frost injury.

For those who are not familiar with the fungus it might be said by way of explaation that it has two types of spores, as does anthracnose. In the European countries the vegetative portion of the fungus lives over in the diseased bark from year to year. In the spring and early summer white pustules of small and large summer spores, or conidia, are produced and the following spring the perfect stage of the fungus discharges is so-called winter spores (ascospores), so that both types of spores are liberated at the same time of year.

The sappy, soft cankers upon which the summer spores occur have been observed on D'Anjou pear during the early part of June and July. For the most part these cankers occur around early-spring pruning cuts and unmistakably are due to infections of the spring. By the middle of June many of these cankers had already reached 20-22 inches in length and 1-5 to 2-5 inches broad in contrast to a maximum growth of about one inch in a season reported for European conditions. If the bark about such cankers is removed it will be found that in most cases the fungus has destroyed the cambium far beyond the superficial limits of the cankers. If the bark is cut through at the margin of the canker where the cambium is thus destroyed the bark shrinks away from the wood exposing a slimy wood surface the limits of which are definite making it possible to cut off the bark beyond the limits of this cambium infection, when disinfection and antiseptic methods are applied.

In contrast to the above mentioned advance of the fungus in the cambium there seems to be a different type of canker formed at times on pear bark—perhaps by another organism but in some respects suspiciously like European canker—in which there is no apparent damage to the bark deeper than the inner cortex. Brownish streaks lead through the inner cortex from one canker to another and sometimes the infection seemingly spreads in this way. In these cases the cambium is apparently in perfect health and remains in this condition during the first season of the life of the canker. This type of canker found on D'Anjou, Howell and Bosc pears, has all the appearance of the early stages of European canker, but I have never seen fruiting bodies of a fungus in connection with it.

In the very early stages of the canker the bark becomes undulating, the raised portions having a watery character. Following this edematous condition the epidermis peels off irregularly giving a more or less shaggy appearance to the new oozy canker. The unbroken epidermis easily slips off upon pressure with the finger. The exposed portions of the cortex which are then dark brown soon becomes black.

As the cankers age the killed bark becomes very much cracked and furrowed, sometimes along irregular lines, but many times especially where the disease made its first vigorous onslaught these cracks take on a more or less concentric arrangement although these concentric fissures do not represent annual growth periods as in the case of the open type of cankers found in other localities, but may represent merely a periodicity of growth of the fungus due to changes in moisture or temperature during a single season. This is perhaps similar to the closed type of canker reported from other regions but evidently is much more rapid in growth. Occasionally in this state cankers are found upon apple which for some reason have developed more slowly (perhaps due to the resistance of the tree) and in such cases there may be a tendency toward an open concentric callus formation.

The old cankers of this disease are easily recognizable when the fungus is fruiting. The winter fruiting bodies are little and urn—or flask-shaped. They have a dark wine red color.

For the prevention of the European canker it is hoped that the summer and dormant sprays with Bordeaux will control infection, but not until our experiments are carried out along this line have we anything to suggest. Of course, it is probable that any amount of spray will not kill the fungus in cankers already started. It is necessary then to disinfect the cankers from all traces of the fungus leaving a clean, smooth surface which should be covered with some antiseptic, preferably Bordeaux paste.

Concerning the treatment of wounds to prevent the entrance of wood-destroying fungi I would say that such canker-producing fungi as I have discussed and winter injury expose enormous quantities of sap wood to infection and it has also long been known that the black wood, known as "black heart," caused by low temperatures is very susceptible to decay. This should be a warning for the orchardists to put forth every effort to protect exposed wood against the entrance of decay-producing organisms, and in case where the organism is present to endeavor to remove all traces of infected wood.

When wounds, whether caused by canker-producing, organisms, winter-injury or pruning instruments, are thoroughly cleaned they should be coated with an "air-porous" application of Bordeaux paste. A satisfactory paste may be made by mixing up with water into a smooth paint some one of the dry commercial Bordeaux mixtures, such as Sherwin-Williams' Fungi Bordo.

Pres. Pearcy: They say that the room will warm up soon as there is heat coming in the radiator.

Dr. Zeller: We have here one of the cankers mentioned which works singly during the first season. It works in the outer portion of the bark. In the second season, it strikes through here. The next season it spreads, but not through to the wood. This has been known in Oregon for some time. There is very good evidence that this is the European canker.

Mr. Thomas: What season of the year would you cut the bark?

Dr. Zeller: Whenever you are doing your pruning.

Mr. Thomas: In summer?

Dr. Zeller: Yes, or in winter.

Mr. Forbis: Would it not be better to destroy the limb?

Dr. Zeller: Trim out and prune the trees. If you want to save the branch, cut it out. The fungus does not go into the wood very deeply.

Pres. Pearcy: We have received a telegram from Mr. C. H. Heck, President of the California State Board of Agriculture.

At this time we will have the report of the Resolutions Committee.

Resolution

We, your committee, beg leave to report that we highly appreciate the cordial welcome extended to us by Mayor Wm. Schultz in the name of the citizens of Forest Grove and by officers and members of the Commercial Club for the use of their hall and for the enjoyable reception and social evening entertainment and extend to them our sincere thanks for their hospitality.

Also extend our greetings to the Professor of the Agricultural college and the other gentlemen for this most interesting and instructive program; also to our outgoing president and to our indefatigable secretary-treasurer, Mr. C. D. Minton, for preparing this meeting with many good wishes and thanks—also to the press for their good will and space in their respective papers in reporting the proceedings of our meeting.

HENRY E. DOSCH,
W. S. BROWN,
Committee.

Mr. Minton: I move the adoption of this report and also include in this report the kindness of the college.

Motion carried.

Pres. Pearcy: We appointed a committee on the matter of increasing the membership of the Honorary List. You will notice that there are no new members on this list since 1911. Moreover, there are only three Honorary members now living. We are not dead as far as horticulture in Oregon is concerned. Let us have the report of this committee at this time.

Mr. Minton: The Committee recommended the following people for membership on the Honorary List: A. B. Cordley, Henry E. Dosch, M. McDonald, J. B. Pilkington, Chas. A. Parke, A. A. Quarnberg, Lloyd T. Reynolds, C. I. Lewis and C. E. Reimer.

Mr. Minton: I move that the recommendation of the Committee be adopted.

Pres. Pearcy: Is there any discussion?

Motion carried.

Pres. Pearcy: Let us proceed with the program. Mr. Brown is the best producer of sour cherries in the state.

RAISING SOUR CHERRIES

By Frank Brown, Dallas, Oregon

Indications point to the early coming of sour cherries in great quantities from Oregon and Washington. When we think of sour cherries, or speak of them to the average man, he assumes that reference is made to the Kentish.

We have, however, several varieties of the sour cherry. Those may be classified in about three groups: The Early Richmond, or Kentish group is all light pink in color of flesh. The Morello group is dark red in color of flesh and skin. The Duke varieties are rather an intermediate between the sweet and sour varieties.

Kind of Trees to Plant

The selection of proper trees for planting is fundamental to the success of the undertaking in this state. It is impossible at present to get trees of some varieties here on the proper kind of root. Because of this, the few who are planting now, are setting out Mazzard seedlings for top grafting.

There are two distinct types of cherry stock—the Mahaleb and the Mazzard. The Eastern nurseries are using the Mahaleb for sour cherries almost exclusively because, from their standpoint, the Mazzard is rather difficult to use, it being very hard to get buds to grow unless weather conditions are favorable.

Under our conditions the Mazzard graft takes much better than the Mahaleb. This has been my experience, at least. I cite the following quotation from a Government bulletin on this question. "Some growers here (East) express preference for the Mazzard as a stock for sour cherries, their choice being based on the stronger and more vigorous growth made by trees propagated on Mazzard stocks when compared with those on Mahaleb stocks grown under the same conditions."

My experience is exactly in line with the above statement. The Mazzard stock does increase the size, vigor and length of life of the tree. About the best way to get trees on Mazzards now is to contract with some nursery to graft this variety for you on the root you desire. Furnish the wood yourself from trees you know are true to name.

Varieties

According to the canners and buyers of this fruit, there is no demand from their standpoint for any of the Morello or sour black cherries, the color being the objection. We can also at once eliminate the Duke cherries as these are subject to worm injury and are too soft. Their quality in general is not the best.

This leaves us only one type to select from. Of these there are several varieties. A good deal of confusion exists in regard to the identity of this group. The eastern nursery catalogues usually list these under the Montmorency group; I would call this the Kentish.

Their resemblance to each other is so close that it is difficult to distinguish the different kinds in this group with absolute certainty. The most important points we are concerned about are, the time of ripening of the fruit, the color, firmness and flavor of the flesh, and the bearing habits of the trees. This leaves us at the present stage of this new industry with but two varieties to consider. These are the Kentish or Early Richmond, and the Montmorency.

Were it not for the lengthening of the cherry season there would be little reason for planting any other varieties than the Montmorency. There seems to be no Pollinization problem. For lengthening the season, however, we will include the Kentish. The characteristics of these two important varieties only will be given here.

We will first discuss the Kentish variety. The importance of this cherry is due principally to its early season of ripening. This is about ten days to two weeks earlier than the Montmorency. This fruit is medium size, roundish in form and flattened at the end. Its flesh is light pink and tender. The fruit will hang on the tree for days after ripening without spoiling. It is uninjured by rain. The tree is medium in size, vigorous on Mazzard roots, spreading and long lived.

As to the Montmorency cherry, this is the most widely-planted of all the sour cherries. It is most productive and constant bearer. It colors well before ripening and is a good shipper. In color it is a glowing pinkish-red. It hangs in clusters and is not injured by rain. Its picking season is long, beginning about July 15, when the Kentish are already gone. The cherry is slightly larger than the Kentish.

The Montmorency tree is the largest and most vigorous grower of all the sour cherries. The top is round and spreading, upright and taller than the Kentish tree. Three-fourths of all sour cherries should be of the Montmorency variety.

Soil and Location

The planter should select his location with great care, especially as regards nearness to market and available labor, as the fruit, after being picked, is very perishable, quick transportation to market is very essential. A relatively large crew is required to handle the crop properly.

The sour cherry does not seem to thrive on a wide range of soils unless the drainage is extra good and the soil is rich in organic matter. There is no fruit tree more sensitive to the ill effects of wet soil than the cherry. Where tilling is necessary to drain the land such soil will be found not very good for this fruit.

Virgin soil will be found far better than any other type. The tree will grow larger in size and will usually be free from disease of any kind. Where our average prune orchards succeed the sour cherry orchard might fail.

Time and Manner of Planting

In our latitude where the winters are mild and conditions of soil will permit, fall planting is preferred. The buds of cherry trees swell and start into growth very early. If planting is too late a large percentage of failures is likely to occur.

Twenty feet between the trees is the best distance for those two varieties. On rich bottom land, 22 to 25 feet apart would be better for the Montmorency. These trees must be pruned to low and spreading shapes or picking will be very expensive.

Pruning the Trees

A wide difference exists between the eastern advice on pruning sour cherry trees and our system of pruning them in the west. Conditions, no doubt, cause this variation.

A practice followed by many in the east is to plant the trees without cutting back or shaping the tree or pruning thereafter. This practice calls for no comment other than its positive disapproval here.

How to prune under our conditions has been well established. We should follow the recommendations made by Lewis & Brown, of the Oregon Agricultural College for the shaping of pear and other fruit trees. Aim at the open or modified leader style. The open center method is perhaps the easiest to follow.

At planting time simply cut the central leader. Also remove all but about five or six lower limbs. Perhaps later on one or two of these may also be taken off.

When removing the center at planting time, you should tip back very lightly as your best buds are near the end.

Keep the tree very low to the ground, starting the first limbs at two feet or less.

My experience thus far shows that cutting off of side and lower limbs is seldom necessary. The tree will take on a beautiful and symmetrical shape if left alone in this regard.

Our practice is to suppress all branches upward, always cutting to an outside bud or branch. That is, I remove the branch that is growing upward or toward the center. The main idea always is to keep the center open, low down and spreading.

Be careful not to make the mistake of cutting off the many small slender branches and twigs growing all around the fork and lower limbs. Your largest crop will be picked from the trees built from the ground up. It is indeed a beautiful and interesting sight to see the children sitting down or on their knees picking this delicious fruit.

Cultivation of the Orchard

With these low headed trees, early plowing is necessary to avoid rubbing off the buds, although with our modern extension tools such injury may be avoided.

Cultivation should be thorough, clean, and in the manner followed by our best horticulturists. Fertilization is very essential as it seems you can not get the land too rich for this fruit. The richness of the soil controls somewhat the age of bearing, delaying it somewhat. This is not a serious fault as their very early bearing habit on poor soil may stunt the tree.

Gathering the Fruit

The disposition to be made of the fruit will govern somewhat the manner of picking it. If the cherries are to be shipped to the fresh market the stems must be left on or the juice will run out and they will soon spoil.

If the fruit is sold to a cannery, located near by, the cherries can be pulled from the stems and the cannery will pay a higher price for them. They are then saved the expense of stemming the fruit and also the loss of the weight of stems.

Some canners have mechanical stemmers which will remove only the large stems, while others have no stemmers at all, this work being done by hand, and the seeding by machinery.

Removing Fruit From Trees

At our farm we pick all our sour cherries by clipping them off with scissors or apple thinning shears. When pickers become accustomed to using shears they will object to any other method. They tie a small pail around their waist and soon attain great speed. All the fruit is taken from the tree sound, unmashed and with the stems on.

We employ school children from 12 to 14 years to pick our cherries. We prefer girls as a rule. The size of the child makes little difference if the trees have been properly shaped as most of the fruit is picked without a ladder.

Diseases of the Cherry

We have but few diseases that trouble the sour cherry. Perhaps the most aggravating pest is the cherry slug. This must be controlled by spraying each year. Leaf spot makes its appearance now and then, causing leaves to turn yellow and fall off before the fruit is picked.

Gummosis attacks this fruit in the same manner as the sweet cherry. It will completly wipe you out of business if not handled right. In regard to this trouble, however, I find the sour cherry trees absolutely free from attack on well drained virgin soil, and if they are on Mazzard roots. I follow the recommendation made by the Agricultural College for all these troubles.

Commercial Products of the Sour Cherry

Up to the coming of the canneries, we had no outlet for this fruit. Now, however, we find many markets for it. Every cannery, having a seeder, is anxious for this cherry for pie fruit. The jam factory wants it for preserves and crushed fruit and for the ice-cream trade. The juice factory makes syrups for the soda fountain from it. The maker of candied fruit wants this cherry and the Maraschino trade is insistent for it.

You are no doubt asking if we are not already supplying this trade with our wonderful sweet cherries. We are doing this only in part. For crushed fruit, the sour is preferred. It is also desired for jam. For Maraschino there is a very strong demand for the sour cherry because of its smaller size. The fruit is now going to a trade that finds the Royal Anne too large. That is, there is not enough count to the gallon. The sour cherries are also the proper size for use by confectioners as dipping cherries.

The Future Outlook

The sour cherry, generally speaking, has been a profitable crop to grow in the East. Doubtless because of the constantly increasing prices, the industry has been very considerably extended in those sections where previously, large quantities have been grown. Its culture has also been taken up in territories not before prominent in growing the fruit.

One of the big jam factories of Washington has been instrumental in getting farmers to plant plenty of sour cherries. This same concern has shipped in several car loads of this variety of fruit from the East for their jam trade. The demand for this trade alone will require an extensive planting of sour cherries. The prospective cherry grower, however, should not be misled by the high prices secured the last few years and make a hysterical planting of this delicious fruit.

As the younger orchards come into bearing, competition may be expected to increase with a corresponding decrease in price unless growers are properly organized to push the sale of this fruit, as has been done with other fruits, its full market value cannot be obtained.

Fortunately Oregon is going ahead rapidly in organizing its different branches of horticulture. Growers seem to feel able to care for their future plantings without difficulty. Through advertising they are reaching new markets. Our many private packing plants are, also, doing a great work in promoting the sale of our wonderful fruits.

What to Expect From Your Orchard

If the prospective cherry grower has been careful in selecting the proper varieties; if he has made no mistake in securing the right strain, and also if he has obtained trees from root crown gall or hair root, he can, by planting on the right kind of soil and giving the trees expert care, expect his trees to begin bearing at four or five years old. He should gather from 25 to 120 pounds of cherries from such trees. They should increase in yield steadily until the trees may produce 150 pounds of cherries, or more, at maturity. We have taken from 190 to 125 pounds from 5 and 6 year old trees on virgin soil.

Pres. Pearcy: I think we had better endow Mr. Brown with a professorship. Is there any discussion?

Mr. Minton: Mr. Brown made a remark during his paper with which I cannot agree. The canneries pay more for the cherries without stems than with stems. He may have had that experience but if he ships cherries to me, I want the cherries with stems. In the first place, we want the juice of the cherry, and in the second place, the cherries must arrive the same day as they are picked. Otherwise the cherries will mold in the box. I don't want the grower to get the idea that the cherry can be sold without the stem.

Mr. Forbis: Do you stem them by machinery?

Mr. Minton: We do not. We stem them by hand. Cherry stemmers are not satisfactory.

Mr. Brown: This idea about stemless cherries was given to me by a man who canned cherries. However, his cannery went bankrupt.

Mr. Forbis: Did you ever try dusting the trees?

Mr. Brown: Yes, but I cannot get dust enough to do the job nor men enough to do the work.

Mr. Weatherspoon: Dust will completely eliminate the slug. Dry arsenic, early in the season, gives good results and kills the slug.

Mr. Brown and Mr. Forbis: I meant road dust.

Prof. Brown: I am interested in pruning. I would like to refer you to a bulletin by Roberts of Wisconsin. It does not agree with the catalogue maker. The type of pruning that Mr. Brown is following is like that described by Roberts.

Mr. Minton: There are two varieties of Montmorency.

Mr. Brown: There are four or five varieties.

Pres. Pearcy: How does the price of the Royal Annes compare with that of Montmorency?

Mr. Brown: One year Royal Annes were 12c and Montmorency were 8c. Another year Royal Annes were 8c and Montmorency were 7c. Montmorency can take less because the investment is not great. We can afford to take less because our crops are so large.

Mr. Minton: You are surer of a crop in Montmorency.

Mr. Brown: I thought so until last year.

Mr. Minton: Montmorency is an every year bearer. Last year was an exception to prove the rule.

Mr. Brown: Yes, except this year. I have a neighbor who has a twenty five year old tree and got twenty five pounds from a hundred twenty-five pound tree of Montmorencys. The rain spoiled the Montmorencys.

Mr. Anderson: Do cherries do well on rocky soil with no cultivation?

Mr. Brown: That is like some old womens remedies for sickness. I have two nine year old pie cherry trees in my back yard. They are growing in rocky soil and are only one-half the size of cultivated trees that are two or three years younger. There must be organic matter in the soil. Trees do not grow in rocky soil as well as in cultivated soil.

Pres. Pearcy: The next paper is "The Relative Importance of the Small Fruit Industry in Oregon," by L. P. Wilcox, Assistant Department Horticulture, Oregon Agricultural College.

THE RELATIVE IMPORTANCE OF THE SMALL FRUIT INDUSTRY IN OREGON

By L. P. Wilcox, Assistant Department Horticulture, Oregon Agricultural College.

Approximately 25 per cent of the entire revenue obtained from all fruits and nuts, in the state of Oregon this past year, was realized from the group known as small fruits. This shows an increase of 15 per cent in dollars and cents in the past ten years. As for the yearly continuation of this increase, marketing restrictions will be the limiting factor rather than lack of suitable soil or unfavorable climatic conditions.

The term "small fruits" as discussed in this paper will apply to the following fruits given in the order of their importance, according to acreage:

The Loganberry comes first with an acreage of 5427 acres for the entire state. However, one-half of this acreage is in the county of Marion, and Salem being termed the center of production. This may be explained by the fact that Marion county has a vast area of a typical soil unusually well suited to the growth of the Loganberry. This, coupled with mild winters and plenty of moisture in the spring, causes this berry to produce maximum crops. Salem was the home of the largest juice and products plant in the state and naturally, this ready market caused a greater interest and consequent growth in Loganberry culture.

Second to the Loganberry comes the strawberry with a combined area of 3500 acres. The strawberry does well upon a wider range of soils and thus is distributed over almost the entire state. About one-third of the above acreage will be found in Hood River county, although Marion, Multnomah and Linn counties may be given honorable mention, as strawberry producing sections.

The raspberry, both red and black, is third in order and is represented by 2500 acres—of which one-third are in Multnomah county. The well drained river bottom soils in that county have produced maximum crops. This past season Mr. Spath, of Gresham, obtained the unusual yield—4¾ tons of raspberries to an acre. With such yields as that, there can be no doubt as to the suitability of that district for raspberry culture.

Blackberries and dewberries are fourth. These berries are grown upon 2000 acres in the state which does not include the wild blackberry acreage found in the Willamette Valley and coast sections. Lane county leads all districts with about one fourth of the acreage.

The cranberry, which is so particular about its soil requirement, is fifth with a total of 125 acres of bogs. Because of this particular requirement, the cranberry is found only along the coast where flood lands have resulted in suitable bogs. Clatsop county boasts of having three-fourths of this acreage and can justly claim the center of cranberry production in Oregon.

Currants and gooseberries are last with only 100 acres for the state. This acreage is fairly well distributed over almost all the fruit districts.

Summing up the above fruits in regard to their acreage yield and total values, the table below may be of interest:

	Acreage for state	Aver. yields	Total yields	Total value
Loganberry	5427 A	1.5 tons	8140 tons	$1,000,000
Strawberry	3500 A	1.4 tons	4900 tons	1,176,000
Raspberry	2500 A	1.5 tons	3750 tons	750,000
Blackberry and Dewberry	2000 A	1. tons	2000 tons	400,000
Cranberry	125 A	1.2 tons	150 tons	36,000
Currants, Gooseberries	100 A	1. tons	100 tons	16,000
Total value for state				$3,378,000

In looking over the other agricultural industries of the state we find the following:

	Acreage	Ave. yield	Total yields	Total value
Apple	48565	88.1 bu.	4,280,872 bu.	$3,210,653
Prunes	26516	.75 tons	6629 tons	4,500,000
Corn	62590	30 bu.	1,874,664 bu.	2,429,000
Hops	12000	825 lbs.	9,990,000 lbs.	3,960,000
Potatoes	43205	139.8 lbs.	6,041,582 lbs	7,829,867
Wheat	1,000,000	20 bu.	20,000,000 bu.	25,000,000

In making a comparison of some individual small fruits with other individual argricultural industries, we can contrast the following:

The Loganberry having only about one-fifth the acreage of the prune, yet brought in a total revenue of 25 per cent of that returned by the most valuable of tree fruits.

The strawberry with an acreage of one-third of that of the pear, returned in dollars and cents a greater sum, thus giving a revenue per acre of over three times that of the pear.

The raspberry equalled the revenue brought in by the cherry crop, but is only one-half of the cherry industry according to acreage.

The limited cranberry crop alone realized a total value equal to that of the peach industry.

The total value of the group "small fruits" as given above, may be compared with values received from some of our leading crops, crops that have placed Oregon on the list of important agricultural states.

The combined revenue of small fruits equalled approximately $3,378,000 or 5 per cent greater than that received from the apple; 55 per cent greater than that received from the pear; 70 per cent greater than that received from the cherry; 33⅓ per cent greater than that received from barley; 33⅓ per cent greater than that received from corn; and equals approximately to that received from hops. In comparison with the King of all crops "wheat," remember first that the small fruits are grown upon an acreage one seventieth of that occupied by wheat and yet the revenue received equals 12½ per cent of that returned by this of all crops.

In conclusion, we can say that the increase in acreage of the small fruits in Oregon has been rapid. In 1909, the total area devoted to this industry was 5122 acres, or about the present acreage of Loganberries alone. In 1919, this total was 8463 acres and this past season reached the high mark of 13,652 acres, thus showing an increase of approximately 168 per cent for the past twelve years. This is contrary to the movement for the entire United States—for the small fruit acreage has decreased about 30 per cent in the past twelve years.

The small fruit industry is assured of a place among our agricultural industries for does it not return in value more than the apple; the pear; the cherry; barley; corn; and hops. These latter crops are all listed as standard industries for the state of Oregon.

And now arises the question as to the future of this industry. As I have stated the future is going to depend upon the markets or in other words, the "law of supply and demand." The markets for small fruits is restricted because of the perishable nature of this crop. Therefore the future of the industry in Oregon depends upon the ability of the canneries, evaporators, and product manufacturers, or those who handle perishable fruits, to develop a demand and provide a market. With a decreasing supply as caused by decreased acreage for the United States, there seems to be no reason why Oregon should not continue to increase her small fruit acreage, and no doubt this would be done if the market conditions would improve. Such fruits as the Loganberry and Evergreen blackberry whose natural habitat is in Oregon, will not be met with competition from other states, but even their increase is limited by market conditions.

Therefore the only answer to the future of the small fruit industry in Oregon is that, when the demand increases, so should the acreage increase, and this can readily be done for Oregon has thousands of acres suitable for this industry.

Pres. Pearcy: We appreciate the novel way of impressing us with the importance of the small fruit industry.

The next number on the program is "Ohio Red Rome"—A Promising Apple for Oregon, by Professor Henry Hartman, Department of Horticulture, Oregon Agricultural College.

THE RED ROME—A PROMISING NEW APPLE FOR OREGON

By Henry Hartman, Assistant Professor of Pomology, Oregon Agricultural College.

It has been evident for some time that Oregon is in need of new commercial varieties of apples. The present demands of the trade, coupled with the reports of rather low production and general dissatisfaction by the growers, indicate that the varieties now grown in this state are not satisfactory in all respects. It is quite clear that Western Oregon, in particular, is in need of at least one commercial variety that is red in color, of good size, and which is a fairly late keeper. The variety, in addition must be a good producer, reasonably free from scab, and fairly well adapted to soil and climatic conditions.

With this need in mind, the Experiment station at Corvallis, a few years ago, established an apple variety block of some 225 varieties, thinking that out of this number surely a few would be adapted to Oregon conditions. Strange as it may seem, however, but few of these sorts are even promising at this time. For one reason or another, the varieties, almost without exception, proved to be unsuitable. Out of the entire collection, in fact, only one or two appear to be of such caliber at this time as to deserve a place in the list of commercial sorts. Undoubtedly the best of these is the "Red Rome." The merits and the weaknesses of this variety can best be ascertained by first considering a few facts relative to its colonial parent, the common Rome. The common Rome was first propagated by Mr. H. N. Gillett of Lawrence county, Ohio, and was brought to the attention of the Ohio Convention of Fruit Growers in 1848. Like many other varieties of apples, it originated as a chance seedling. Its true parentage, therefore, is unknown.

The variety seems to have been popular from the beginning, and even now it is a leading commercial sort in many apple sections. It is a favorite with many growers because of its early and regular bearing, its uniformity of size and color and comparative freedom from blemishes. It is respected by the trade because of its size, ease of handling, and slight susceptibility to scald and other storage troubles.

Shortly after the introduction of the Rome into cultivation, it became evident to horticulturists and especially to plant breeders that the color composition of this apple was more or less unstable. Occasionally here and there within the variety, there appeared individual fruits which presented peculiar color markings. A certain tree or part of a tree, for example, would produce apples that were distinctly marked by alternating longitudinal bands of dark red. This was unmistakable evidence of two facts: (1) that the Rome carried at least two distinct color factors, and (2) that segregation of these factors was being accomplished by bud variation. So it was that those trained in plant genetics were able to predict that some day a

Red Rome would appear; i. e., a Rome wherein dark red would appear as the dominant color factor. This prediction came true in the orchard of Mr. W. T. Cox of Ohio, when the Red Rome, a product of bud variation, made its appearance a few years ago.

So far as anyone can determine, the Red Rome is merely a Rome embellished with a bright red covering. In the other characteristics such as form, size, texture, quality and tree habits, it appears to be nothing more than a common Rome. In this respect the new variety is like most bud variations, being essentially a one character variation. This being true, a long test of the variety should thrive under those conditions that are suitable to the Rome.

Since the original Red Rome first made its appearance, other Red Romes have appeared in various parts of the country. This again is in keeping with a general law of bud variation; i. e., the same variation usually appears not once, but many times.

During the past few years the Red Rome has been under observation at the Experiment station at Corvallis, and the members of the department of Horticulture feel that the variety is at least promising, for the state of Oregon and other Northwest localities.

Thus far, the new variety has proved to be the equal of its parent so far as production is concerned. It withstood the freeze of December 1919 apparently without damage. Thus far, it has shown no trace of spray injury either by Bordeaux mixture or by lime and sulphur, and but little difficulty has been encountered in keeping it free from scab.

It must not be inferred, however, that the Red Rome is a perfect apple and that it is entirely free from objectionable features. To quote an old proverb, "Every Rose Has Its Thorns." There has been noted, in some individual cases, a tendency for the Red Rome to revert back to its parental type. Within the variety, occasionally a branch or part of a tree produces fruits which are striped or variegated i. e., instead of displaying the true solid red characteristic, they display partial reversion to the color of the common Rome. Just how serious this will prove to be is not definitely known at this time. It is to be assumed, however, that if a Red Rome with a solid red color is to be maintained, great care will have to be employed in the selection of the propagation wood, for scions taken from reverting branches can be expected, in most cases, to produce reverted trees. Experience with other bud sports indicates that with a certain amount of selection, the percentage of reversion can be kept down to a minimum. It is not to be assumed, however, that selection, no matter how carefully practiced, can ever completely remove the possibility of reversion, for selection cannot definitely fix the type in those varieties that are the results of bud variation, and which manifest tendencies of reverting back to ancestral types. The heritage of such varieties is made up at the time the variety is formed and selection can have no material influence on the heritage after it is once determined.

Prof. Hartman: I have here a few of the Red Romes and some of the comon Romes. I would like to have you compare them. Here is one particular apple. It came from the same tree as the dark red apple. Part of it is dark red and part of it is light red in color.

This tree would produce partly reverted apples. It is a problem to get hold of the propagation wood that will bear good fruit. Many trees show signs of reversion. Trees from Yakima show that tendency. We ought to find out where there are trees that produce the solid red type and get some of that propagating wood. We have only two small trees at Oregon Agricultural College, so we cannot supply this propagating wood. We feel that we can get an improvement over the old fashioned Rome.

Member: What is going to be its name?

Prof. Hartman: Red Rome.

Mr. Minton: These apples have scab or spray burn. Is it characteristic or accidental?

Prof. Hartman: Accidental.

Mr. Forbis: Are they uniform?

Prof. Hartman: Yes, they are very uniform.

Member: As to color?

Prof. Hartman: Yes, with the exception of this one branch that produced reverting types.

Member: How long a keeper are they?

Prof. Hartman: About as long a keeper as the old Rome. They are a fairly old keeper.

Member: Can any nursery supply it?

Prof. Hartman: I would be afraid of a nursery. I know of no nursery that can do so.

Member: Are there quite a few of these in the Lewiston district?

Prof. Hartman: I do not know how extensive it is.

Mr. Snow: For ten years we have been growing that type of apple in Yakima. You can get propagating wood there.

Mr. Mills: Is the flavor the same?

Prof. Hartman: Yes.

Mr. Lewis: I hope there will be no attempt to rename this apple. I think the name of Red Rome will get by. It is hard to change a name. A person could get a premium even on a small amount. The Rome is one of our best varieties. Oregon Agricultural College can get considerable tests on the Red Rome.

May I comment on Mr. Wilcox's talk? His method of presentation is interesting. He is too conservative but that is better than to exaggerate too much. The government figures are always low. The last figures from the State Board of Horticulture show a material increase in the acreage of strawberries. There are a thousand new acres of loganberries coming in this year. His figures would then spring up a great deal. I refer you to Polk county for a gooseberry district. The gooseberry figures will spring up three or four times as high as that. One ton of gooseberries per acre is very low. He has shown the wonderful growth of the small fruit business but he has not given it quite the justice it deserves.

Mr. Minton: What is your yield this year?

Mr. Hazlett: I have a five-acre patch of Loganberries and the average yield is five and one-half tons.

Mr. Larson: I get four tons of blackberries from a three-quarter acre patch.

Mr. Lewis: The prune men get about three thousand pounds per acre. Some will have low and some will have abnormally high yields.

Prof. Long: Do you mean that the average yield is three thousand pounds?

Mr. Lewis: Yes.

Mr. Forbis: I have prune trees that bear two tons annually when they are in the best condition. Three thousand pounds per acre is too much. I have forty-five acres and two tons an acre is the most I have ever gotten. I do not see how prune trees can yield three thousand pounds per acre annually except in special cases. I believe that that is a big yield.

Mr. Lewis: There is a large per cent of young orchards that is rapidly coming forward to bring up the yields.

Mr. Purdin: I get three to four tons a year. This is done by means of the fertility of barn yard manure.

Mr. Reuter: We have had a little over two tons per acre. Thirty year old trees give an average of one and a half tons. There is a three-acre tract which has yielded over two tons annually for fifteen years. It is a rented tract. The owner has never been on it.

Pres. Pearcy: It being Saturday, we would like to hurry up the program. So we will start a little early this afternoon.

Mr. Angel: During the week of December 12 there is to be an important meeting held at Spokane, Washington. The Oregon Farmer gives the schedule of meetings. It should be very interesting. The Washington Horticultural Association, the Northwest Grade and Pack Conference and Show, the Washington and Northern Idaho Farmers Union, the Northwest Potato Conference and Show—all these will be in session at Spokane at that time. Some of the speakers are President Kerr of Oregon Agricultural College, Mr. C. I. Lewis, President Barrett of the Farmers' Union, and men from the Federal Departments and the University of Washington.

Meeting adjourned.

SATURDAY AFTERNOON

The meeting was called to order by the President, Mr. Earl Pearcy.

Pres. Pearcy: We have been unfortunate in shifting our meeting place around. It has detracted from our attendance. However, we will not wait for all of them to come in.

The first number on our program for this afternoon is "Growing Apples in the Willamette Valley," by B. W. Johnson, Manager Oregon Apple Orchard Co., Monroe, Oregon. Mr. Johnson is one of the best apple growers in the state of Oregon.

GROWING APPLES IN THE WILLLAMETTE VALLEY

By B. W. Johnson, Manager Oregon Apple Orchard Co., Monroe, Ore.

That I am here is evidence that a prophet is not without honor save in his own country. Up in our section, the natives were prone to regard me as a nut. They sat around the stove in the town grocery and general merchandise emporium and discussed me and the enterprise with which I was connected in most ungentlemanly terms. They said that I was crazy in the head and that my associates had more money than brains if we thought we could raise fruit on them squirrel lands; that them red hill ranches were only fit for goat pastures anyhow. During the past couple of years some of them are changing their tune, however. They have seen the fruit we are growing and some of them now say, "I always said them red hills are the best fruit soils in the world." I quite agree with them.

When I was requested to come here and talk to you about growing apples in the Willamette Valley, I was told that the fruit grown in the valley this year was generally small, of poor color and inferior quality; that the production per acre was too small for profit and that the growers of this region were becoming discouraged. The same party stated that the Oregon Apple company was growing the largest and best apples in the valley at Monroe and that it was up to me as it's manager to tell the growers how we did it.

In the first place, my observation leads me in the belief that there are too many "doctors, lawyers, merchants, thieves" engaged in the business and not enough real honest-to-goodness fruit growers. It would be a good thing for the industry if a lot of them could be prohibited by law from further activity in the game.

We should not lose sight of the fact that raising apples is a highly specialized industry. Given the soil and climate necessary, the production of high grade apples is, to an extent, dependent on the attitude of mind of the grower. It is a mistake to attempt to grow corn and hogs, run a dairy, raise grain and 57 other varieties of farm products, along with raising apples. If you want to diversify, diversify with fruit. If you are going to stay in the game, grow fruit exclusively. Specialize on size and quality.

A man with an apple orchard of five acres or less, invites disaster. A ten-acre unit of apple should be the minimum. Twenty acres would be better, and I am inclined in the belief that 30 or 40 acres of tree fruits—probably somewhat diversified—would be still better.

Another thing, apple raising is not a poor man's game. The trees should be pruned and sprayed and tilled each year whether you have a crop or not. It is a dangerous undertaking to attempt the development of an orchard unless one has the means or an income sufficient to defray the expenses of development up to the time the orchard comes into profitable production. And, I'll tell the world that means nine or ten years in the Willamette Valley for an apple orchard and at a cost of $500 per acre in good American money.

Ten or fifteen years ago we were handed a lot of bunk about being able to bring an orchard into profitable bearing in six years at a cost of from $150 to $200 per acre. It cannot be done, as all of us have found out. That is why a lot of growers are becoming discouraged. They expected earlier profits, and in many cases they have not had the means with which to handle their orchards properly during the last four or five years of high development costs.

As a general proposition, I maintain that apples of size and quality can be grown in the Willamette Valley at a profit. Some orchards are planted on low, flat land, others are located on the river bottoms. Such orchards do not have proper air drainage, and are subject to more or less damage by frost to both trees and crops.

Too much care cannot be exercised in the selection of the land for an orchard. Before we planted ours, we had several thousand acres under option and before the purchase of any land, we had it examined, bored and tested by a soil expert from the college, Prof. H. D. Scudder. We followed his recommendations in the purchase and subsequent planting of the land, and since then have often been impressed with the wisdom of this course.

Many, in fact most of the apple districts, are handicapped because of restricted tonnage. For best results there should be from three hundred to a thousand or more in a district. In districts where small acreages obtain, it is necessary to ship mixed cars—often mixed both as to grade and varieties—and you cannot market mixed cars to good advantage. Straight cars of one grade and one variety bring better prices. To obviate this handicap, I would strongly urge the consolidation of the fruit from nearby districts at some central point. With the improved condition of the roads, it would be possible to consolidate the fruit from a considerable radius. By using one shipping point instead of half a dozen, would permit of loading in solid cars of one grade and one variety, and sales from such cars would bring a sufficient advance over the mixed cars, to more than pay the transportation costs for consolidation purposes. Such a plan would insure more efficient inspection and a better and more uniform grade and pack. The large community packing house has proven its worth. The house with a large output will handle the fruit more efficiently and more cheaply. If the Willamette Valley ever achieves the highest possible standing as an apple producing section, some such plan must be adopted.

In this connection, we must eliminate the unfit either by a process of education, or, failing in this, BY LAW. No man should have the right to menace an industry or jeopardize his neighbor's business either through ignorance or indifference.

As long as Willamette Valley growers are satisfied to raise junk and ship it "face and fill," just so long will the Willamette Valley fail to attain any high standing as an apple producing section.

I cannot give the growers any hard and fast rules to follow that will insure the raising of good fruit. Each grower has an individual problems. Soil conditions and pruning methods vary. Uniform orchard practices are not followed. During the past four years we have experienced little difficulty in developing size, color and quality. This rquired attention to five important details—pruning, spraying, fertilization, tillage and thinning—with emphasis on the last two—tillage and thinning.

Without plenty of light and air, apples will not set well, not color properly. Hence, it is important that trees be kept open by means of intelligent pruning.

We follow the spraying program as outlined by the specialists at O. A. C. If this program is followed out effectively, there should be little loss from either fungus or worms. Most of our spraying is done with high pressure outfits using 300 pounds or better, and at the proper time. We applied seven sprays during the past season. Our warehouse foreman informs me that our culls will not exceed three per cent of the crop.

Cover crops and artificial fertilizers and preferably both, must be used systematically if best results are to be obtained. If the fertility of the soil is to be maintained, the tillage will be cared for with less effort, the trees will tend to set heavier and the moisture content of the soil will be more easily conserved.

Plowing, two double discings and two or more kimballings or harrowings should constitute a minimum tillage program. Years when plowing is omitted, a third double discing might be added with good results. Tillage should begin early and the light tillage, such as kimballing or harrowing, should continue late. Growth and vigor of trees and size of fruit are largely dependent on thorough and frequent tillage.

A friend of mine living in Spokane told me once that he hired his worst enemy to do his thinning and then went away and let him do his worst. With some limitations this plan might be followed with profit in the Willamette Valley. At Monroe, we do not follow any hard fast rule. While 6 inches is a general gauge to follow, the variety, the condition of the individual tree, as well as the set of the fruit are all factors to guide one in his thinning operations. During our thinning season we had as high as 75 persons working the past season at a total cost of $2522.64. Always take off the undersized fruits regardless of their position on the tree, IS ONE SAFE RULE TO FOLLOW. If an apple is perceptibly small at thinning time, it is almost certain to be in the five-tier class at packing time. Thin early, thin thoroughly and always thin off the double and the little ones. We took off easily 75 per cent of our Ortleys this year and yet many of the trees were overloaded. Always thin heavily on Jonathans and Grimes. These varieties tend to grow small and the trade does not want the small ones. While 10 per cent of 175s and smaller will usually be accepted, many orders received this year by us provided for 163s and larger—no 5-teir stock being wanted.

Intelligent thinning is an intelligent orchard practice. The last two years, particularly, the 5-tier stuff has been bringing from 25c to $1.00 per box under the market for the larger sizes. This trouble is not confined to the Willamette Valley, but is Northwest wide in scope, as indicated by the following, which I will quote, from a recent bulletin from the Northwestern Fruit Exchange:

Future of the Industry.

There is one cloud, perhaps, in the estimation of many no bigger than a man's hand, but one that we are studying with increasing anxiety. It is the problem of small sizes. We believe it to be our duty to sound a note of serious warning to every client of the exchange. Had the Northwest been confronted this year with serious competition on the part of eastern and middle-western districts, hundreds of thousands of boxes of this year's Northwestern crop would have been worthless for commercial shipment. We mean the small sizes. Under the exchange system of selling, we are generally successful in inducing buyers to take cars containing up to 10 per cent sizes 175s and smaller without discount. This is not done by the trade willingly, but under pressure. When it comes, however, to any excess over this percentage, or to the marketing of straight carloads of small sizes, the problem of selling them at a price which will return a profit to the producer is becoming increasingly more difficult year by year and we are entirely certain that in years of normal competition between the East and the West, this surplus of small sizes will find no profitable market unless it be to the canneries and by-products factories.

"As the orchards grow older, there is of course a natural tendency for the sizes to average smaller, but, while the writer of this letter and others of the exchange officials do not profess to be authorities in matters of production, we are impressed by the weight of evidence which points surely to the fact that the average sizes produced by any given orchard in any given year are very largely a matter of control on the part of the grower. All of this of course, assuming that the water supply is normal and the weather conditions normal. Impressive evidence points surely to the fact that methods of control consist of proper thinning and particularly to proper fertilization. The cost of fertilizer is, in our opinion, absolutely negligible in comparison with the benefits. When a market difference of 50c to $1.00 per box prevails between sizes 175s and smaller and 163s and larger, it is not difficult to demonstrate the relative insignificance of fertilizer that cost a few cents per box.

"The reputation of the Northwestern apple and its commercial success is very largely founded upon the idea expressed in the slogan "The Big Red Apple." Bear in mind that your apples are sold, in all but a negligible degree, from fruit stands and that small apples, no matter how well colored nor how perfect they may be otherwise have nothing like the appetite appeal and sales pull that large apples have. Whether this is reasonable or unreasonable, it is sound psychology and will have to be reckoned with by every grower hoping to make a permanent success of his business.

"We cannot too strongly urge every grower in the SKOOKUM organization and every Board of Directors of the various shipping organizations to give this matter most earnest and serious consideration and to take steps, before it is too late to adopt measures looking to the regulation of next years apple sizes."

Also, this same idea, coming from a different source, THE PACKER of November 5th, puts it up to the grower in a very concrete way:

"Yakima, Washington. A thinning contest conducted in the orchard of O. W. Melton in the Fruitvale district this season by E. G. Wood, extension horticulturist of the Washington State college, in cooperation with the farm bureau, shows that the thinning increased the value of the fruit $3.20 per tree. Increase in the value of the crop at that rate in this particular orchard where the trees were 100 to the acre would be $320 per acre.

"In view of the fact that the thinning was done later than it might have been and in view of the comparatively small size of the fruit, the benefit from the thinning is not as pronounced as might be expected and the estimate of its value in the crop, $320 per acre, is quite conservative, it is stated. Mr. Wood put on 12 thinning demonstrations in Yakima county this year and it is the general belief that the instruction given will bear fruit in more care in thinning and large size of fruit.

"In this particular test the value of the fruit on the thinned trees amounted to $24 as against the value of $20.50 for the fruit on unthinned trees. The cost of the thinning was estimated at 50c per tree. The two trees were the same size, in the same condition and as near alike in set of fruit and general thriftiness as it was possible to select. The unthinned tree had slightly more apples on it than the thinned tree, but both trees packed out the same number of boxes. The thinned tree, however, had the advantage in size of fruit and in color, making the crop on it worth $3.20 more than the unthinned tree."

Thin as early as you can, and then go over your orchard at intervals during July and August—particularly your Grimes and Jonathans, and then thin again the trees that seem to be carrying too big a load. We had a car of King apples and a car of Bartlett pears rejected this year because the fruit was too large.

We had one block of 60 acres of apples which will probably show a net profit of $75 to $100 per acre this year. It is planted to Kings, Spys, Newtowns and Ortleys. It produced between 12,000 to 15,000 boxes of fruit. On this particular section the tillage was $5.20 per acre, spraying $17.95 per acre, including cost of spray materials, pruning $16.25 per acre and thinning approximately $12 per acre. Including overhead and miscellaneous expenses, the cost of producing a crop on this section will run about $60.00 per acre. As pack-out statements are incomplete per box costs are estimated. We estimate the tree-to-car expense at 60 to 65 cents per box. Based on a crop of four boxes to the tree or 200 boxes per acre at 60 cents per box we have a tree-to-car expense of $120 per acre and a production cost of $60 per acre, making a total of $180 per acre or 90 cents a box for all grades and varieties.

Cost of production, including physical handling should not exceed $1.00 per box and ought to be kept down to 75c per box as the production increases.

In this connection I would strongly advise more attention to the production of apples of size and quality. If it is going to cost us 75 cents to $1 per box to get our apples grown and loaded on cars, no financial expert is required to show us that we are losing money on nearly every box at C grade or 5-tier apples we ship.

In my judgment, the best thing that could happen the industry, would be the definite and immediate refusal of the trade to accept our small apples at any price. Such action would eliminate at least 25 per cent of the apples now seeking a market from the Northwest. We would save 25 per cent of our investment in boxes, paper, nails, and packing labor. It would relieve congestion in our packing plants and assist greatly in solving the car shortage problem. It would be better far for all of us if we could build and operate large by-products plants in every producing section in the Northwest. These plants should have capacity to convert all of our C grade and 5-tier apples into cider, vinegar, jelly, jam, dried apples and the like at a normal price per ton. Such action would restrict the output of the Northwest probably 50 per cent and would go a very long way in stabilizing the market and insuring to growers a good margin of profit. It would also have a tendency to force growers to raise larger and better grades of fruit or go out of business. I sincerely believe that some drastic action is necessary, especially with respect to some methods of restricting the output of small apples.

Along this line it would also be well to give more thought to the matter of varieties. Mr. Frazier, of the Oregon Growers, informs me that more than "57 varieties" are being grown in the Willamette Valley, whereas we should confine ourselves to the growing of a few very desirable commercial varieties. King of Tompkins County, Grimes Golden, Winter Banana and Ortley are varieties that give evidence of satisfactory yields of high quality fruit. The Baldwin, Stayman, the Winesap and the Delicious do better elsewhere. When we confine our production to the varieties best suited to our soil, elevation and climate we will have gone a long way on the road to success.

After growing a crop, do not be afraid to pick it early. Our losses were heavy both this year and last on account of rain. This year the market has gone off 50c to $1 per box since the season opened and there was no car shortage until well toward the end of October. Year in and year out, the fellow who beats the game, is the fellow who handles his crop early. We commenced picking Grimes September 5th and then waited a few days for some of the varieties to mature, and in doing so we made a mistake. But at that, we had our Jonathans shipped by October 5th and on October 15th we had everything shipped except Ortley and Newtowns. Early shipments included Bartlett, D'Anjou and Comice pears, Grimes, Kings, Jonathans, Wagners, Spitz and Northern Spy apples—all shipped out by the middle of October, amounting to 27 cars.

Average net returns on the first of these ten cars was $1,341.87 per car; on the second ten, the average was $874.67 which in a measure reflects the early drop in the market. However, the average for the first 27 cars was $1,117.00 per car net to us, after paying advertising and selling charges. Figuring 756 boxes to the car this gave us an average for all grades and varieties of $1.47 per box. Owing to serious market decline about November 1st, the average net price per box is bound to be lower on the remainder of the crop.

Early and intermediate varieties should be crowded to the limit. By doing so you pave the way for earlier picking of the late varieties and reduce the possibility of weather damage to the minimum. As a rule, we all pick our fruit too late. Do not wait for color if the fruit is otherwise sufficiently mature for picking. Had we gained a week, we would have had our crop in the dry before the rains began October 12th. At that time we had about 12,000 boxes unpicked and I figure that we will lose at least 25c per box on one-half of it because of the ill effects of the rain.

Take it by and large, I do not believe the apple industry of the Northwest has suffered as much financial loss as other lines of production. Farmers generally have been compelled to take a big loss. Hops and grapes seem to be the only commodities that have shown a real profit. And there's a reason—Mr. Volstead.

Willamette Valley orchardists have probably suffered financially more than growers in other sections. One reason for this is the fact that most of our trees are young and were planted at wide distances apart—thirty feet on the average—and our production has been correspondingly lighter. In the Yakima and Wenatchee valleys the orchards have from 50 to 100 per cent more trees per acre than we have. Generally speaking their orchards were planted on virgin soil—volcanic ash—and with irrigation, their orchards have developed more rapidly than most of ours. With double the number of trees to the acre their orchards have naturally come into profitable production ahead of ours. They are now, however, paying the penalty for the excess of trees per acre. The percentage of small sizes is becoming an alarming problem with them. You can say this for them, however—most of the fruit growers up there are engaged exclusively in growing fruit. Down here, too many are making fruit growing a side line.

In considering the paucity of profits during the last two years, we should not fail to take into consideration the fact that unusual weather conditions contributed heavily to our financial losses. We will not recover from the ill effects of the freeze of December 1919, in a generation. Probably every fruit tree in the Willamette Valley was somewhat devitalized, and many of them were severely injured, while thousands of trees were killed outright. This caused rapid spreading of anthracnose and a very serious development of heart rot. Orchardists who failed to recognize the serious effects of the freeze and apply the proper treatment, are going to pay the penalty for many years to come. We estimate that it has cost us at least $4000 for tree surgery alone as the result of the freeze, to say nothing about the probable loss of production during 1920 and 1921 of a minimum of 20,000 boxes of fruit.

But the freeze cannot be charged with all of our losses during 1920. The rains, that commenced a year ago in August and continued with little cessation until the following April, was responsible for terrific losses to apples in the Willamette Valley. The delay in picking, due to rain, caused an early breaking down of all the varieties left on the trees beyond their normal picking time. This was especially true of Jonathans. Many cars of this variety were a total loss on reaching the Eastern market. And, if this were not enough for a grower to stand, the market went off 50c to $1 a box. So we got hit three times in a row—zero weather, heavy and continuous fall rains and a terrible slump in the market.

During the war, prices for labor and supplies rose to impossible heights and it was one of the marvels of the period that the price of apples did not rise in harmony with the prices for other commodities.

Up to the present time we have passed through some very trying ordeals. All other apple producing sections of the Northwest have other and similar burdens to bear. Although costly, we have gained a lot of valuable experience during the past dozen years. But we have been pioneering, and pioneering usually involves hardships, financial losses and much discouragement. If we are wise we will capitalize our losses and take advantage of the lessons we have learned. As the trees get older, production will increase in the better orchards, and the poor ones will gradually be dug up. I consider that the business is fundamentally better than when our orchards were planted. The peak of production has probably been reached in the Northwest this year. Since the bottom dropped out of the apple planting boom in 1912, there has been little new acreage planted. During this nonplanting period, the mortality among apple trees has been terrific in the East. It was estimated that one million trees were killed in New York and New England during the winter of 1918-1919. Besides this, rarely a year goes by that the fruit crop is not seriously hurt by frost in one or more of the large Eastern producing sections.

However, last year's, 1920, experience should give us cause for encouragement. With the largest commercial crop ever known—some 36,000,000 barrels—our Western apples of quality and size found a market and they brought per box in the Eastern producing sections as much as a wagonload of their locally grown apples. Although not adequately advertised, our Northwestern boxed apples have made a place for themselves in the best producing states in the East; and although handicapped by impossible freight rates which our remoteness of 3,000 miles entails in reaching the market, our apples this year are being sold at remunerative prices. Practically all of our Extra Fancy apples are bringing from $2 to $2.50 per box f. o. b. shipping point this year. At these prices we ought to make a satisfactory profit, providing we are growing a large percentage of Extra Fancy and Fancy grades and have a satisfactory production per tree. We cannot hope to make money, however, if we are content to raise one or two or three boxes of apples per tree and make a "face and fill" pack of them. Growers who are content to raise inferior fruit and put out an inferior pack should be prohibited by law. They can grow "C" grade apples and worse anywhere in the wide world, and they can grow them quite as cheaply as we can and it does not cost them ONE DOLLAR PER BOX FOR FREIGHT AND ICING TO REACH THE MARKET. The Eastern grower has his market at his door. We cannot compete with the East in raising JUNK. We should, however, take into account the fact that we have no Eastern competition when it comes to marketing EXTRA FANCY BOXED APPLES. If you get good size, good quality and good production per tree maintain the highest standard of grade and pack, you have little to fear, provided that your fruit is intelligently marketed. But if you don't do these things, the poor house "will get you if you don't watch out."

Pres. Pearcy: This is a fine paper. We do not want anyone to leave the room unless it is absolutely necessary. We have some more fine speakers. Is there any discussion?

Mr. Pancok: You think that they were on the same market as the Eastern apples?

Mr. Johnson: Yes, absolutely.

Mr. Pancok: I thought that they could not get cars. I did not think that we were competing directly. The East was at a disadvantage last year.

Mr. Johnson: They market in barrels or bulk or wagons. Their apples could not be expected to have the same value as ours under those conditions. The East cannot raise apples.

Mr. Pancok: That is the question.

Mr. Johnson: No question about it. There is no apple in the East like ours. I know because I have lived there.

Pres. Pearcy: How many cars did you ship yourself?

Mr. Johnson: Of apples and pear, fifty-five cars.

Mr. Minton: Do you select the extra from the fancy?

Mr. Johnson: In general, but not in every grade. If they are strong, then there should be two grades.

Mr. Minton: What do you call strong?

Mr. Johnson: They are strong if they are thirty or forty per cent extra fancy and ten per cent not. If they are twenty-five per cent extra fancy, it is enough to sort into two grades. Do not reduce the standard, and do not stop grading. I do not want to seem to be an absolute authority.

Mr. Groner: Are any easterners coming nearer competing with us now than ten years ago?

Mr. Johnson: They have still a long way to go. They have improved a great deal but they must improve their methods of selling.

Mr. Minton: Will it not add to the cost to sort so much and so carefully?

Mr. Johnson: It will not make such an extra cost to grade.

Mr. Minton: You lower the fancy grade by selecting from the fancy to put into the extra fancy. That is the tendency.

Mr. Johnson: We do not lower our grade and it is not necessary to do so.

Pres. Pearcy: Mr. C. I. Lewis, Assistant Manager Oregon Growers Co-operative association, Salem, Oregon, will speak to us on "Factors Which Will Determine the Future of Oregon as a Fruit Growing State."

FACTORS WHICH WILL DETERMINE THE FUTURE OF OREGON AS A FRUIT GROWING STATE

By C. I. Lewis, Assistant Manager Oregon Growers' Co-operative Association, Salem, Oregon

If Oregon is to not only maintain its position but to advance, along horticultural lines, and keep up with its sister state California to the South, and Washington to the North, we will have to take stock in this state and see where our big problems lie, and what we will have to do to maintain ourselves.

Perhaps the greatest factor which we need to wrestle with is that of freight rates, both local and eastern. They are far too high. We should strive to have our freight rates reduced this next year, to pre-war levels. We must strive to have a proper readjustment made in local freights. For example at the present time the freight on cull apples from certain sections of the state to plants where these apples can be utilized, is far too high.

The railroads made an attempt to handle this by zone, but unfortunately this does not cover the entire case. We cannot expect to build up our by-products industry without lower freight rates, not only on our cull products in this state, but lower rates on the finished product to the East.

There is another point which we should become greatly interested in. That is the cost of cans for our western cannerymen as compared with the cost to eastern cannery men. I was told on good authority this past week that it costs an Oregon cannery $30 more a thousand for number tens, than it does the eastern cannery. This is too great a handicap for us to fight.

We have made a splendid start, in canning. For example, Oregon and Washington today lead the union in canned blackberries, loganberries and prunes, standing second in apples, pears and raspberries. 56% of the blackberries, 95% percent of the loganberries, 50% percent of the prunes, 20% of the apples, 15% of the pears, and 30% of the raspberries, are manufactured in these two states, yet this industry is only in its infancy and can be greatly increased with proper encouragement.

Apple Problems

A year ago, we found ourselves facing one of the largest apple crops in the history of the nation, and a crop of which a very large percentage consisted of small sizes. Not only were the apples little, but they were poor keeping, they brought disappointing returns.

This year, with a light crop, the size has been better but the buying conditions in the country have been poor; nevertheless, we have had far too many small apples this year. It is surprising to see the large percentage of little apples, 150 and smaller to the box. These are apples which always sell in the red during years of heavy crops, with the exception of a very few varieties. Apples must be produced larger than 150 to the box. More thinning, heavier fertility, earlier tillage, stronger thinning out of the trees are needed if we are to produce larger apples.

The large apples will sell every year at a profitable price regardless of what conditions are in the East. Small apples can never be marketed to advantage except in years of great crop scarcity.

The next phase of the apple question is that of variety. Our money seems to lie in the early varieties, and in the larger sizes. The earlier we can get the apples off to market, the more money they seem to bring, year in and year out. We are producing all over Oregon, far too many varieties. We need to concentrate our attention as rapidly as possible on a less number.

Too Many Varieties

There are districts in Western Oregon, The Dalles, and similar points, where at least twenty varieties of apples are being offered to the trade. These should be quickly reduced in number. At the Dalles, we would suggest the Spitzenberg, Winter Banana, Delicious, Ortley, Newtown and Stayman, as varieties that seemingly can be grown commercially with profit.

In the Willamette Valley we would hang onto the Gravenstein, and perhaps work over some of the older home orchards in some districts to this variety; Kings, and by all means the Winter Banana, Red Rome, Ortley and Grimes. In a few districts the Spitzenberg, Newtown and Jonathan should be maintained, but the latter variety will be discriminated against to the tune of 25c a box, compared with Washington and Idaho stock. Delicious should be grown only for local consumption.

In the Umpqua Valley, the Spitzenberg, Newton, Ortley, Rome and Winter Banana. The Rogue River Valley, the Banana, Spitz and Newtown. Varieties which were offered this year that we would suggest elimination of at once are Baldwin, Arkansas Black, Black Twig, Falawater, Spokane Beauty, Red Cheek, Jeffery and Sheep Nose.

Earlier Harvesting

For a number of years, we have been urging growers to pick fruit early. Most of our Winter Bananas could be picked before the 5th of September, they ought to be in the market preferably by the middle of September; by the first of October they are worth 50c a box less than they were the middle of September. By the first of November, the Winter Banana will not bring any more money, in fact will probably not bring quite as much money as the later varieties. This same statement will hold true with Gravenstein, King and Grimes. The market will pay a great deal more for early delivery of this fruit. There is not quite as urgent a demand for high color on early delivered fruit as there is on mid-season and late keepers. The trade pays a handsome margin for the early deliveries.

Storage Facilities

We have little or no storage for apples in this state, except at Hood River. We are sacrificing thousands of dollars if not millions by the lack of this storage. With proper storage, we could not only hold apples for local consumption, but could hold apples to be shipped later, by boat to the Atlantic seaboard, California or the interior points of the United States.

It is much more to our advantage to have the fruit stored here where we can watch it and know exact condition it is when it leaves.

Water Transportation Facilities

The water transportation facilities at Portland need to be greatly improved; there is no cold storage for our earlier fruits; we can't hope to build up a fine trade in exporting cherries, apricots, peaches, green prunes and Bartlett pears, without cold storage. It is also very desirable for the holding of the apples.

We should build up our water transportation to the limit, because we can get the fruit into cold storage on the steamer quicker, can get it to market more rapidly and can get it to market more cheaply.

Wider Distribution

Oregon fruits need a much wider distribution. It would seem the year 1921 offered us an unusual opportunity, with a very light crop in the east, to get into new markets. However, few took advantage of this opportunity, and instead what they did was a pell mell rush for the big centers, like New York and Chicago, and much fruit was sacrificed. It was a fine example of not only the state of Oregon, but of the entire Northwest being unable to get together at a time when it meant so much to the future of our industry.

A judicious advertising fund, a little working together to push our apples into new markets, would have made friends for us for the years when we will have a huge tonnage and will need many outlets of consumption. We need in this state, more of a state consciousness, more of a state price, a state unity, a pulling together. We can learn this lesson from California to our advantage and even Washington is ahead of us in this respect.

We are holding up too strong local pride and local jealously. In this at times, we almost reach provincialism. California had to forget the locality and centralize on pushing the state of California to the front. The people there have been successful in this attempt and have been richly rewarded.

Prune Problems

The Oregon prune is little known. It is surprising to note what a small percentage of our population know there is such a fruit as the Oregon prune. In some markets where we formerly used to sell large quantities, the market has been nearly lost. In other sections, very little attempt has been made to develop new outlets. Some day the big crop is coming. Perhaps it is next year. Then is the time we will wish we had been advertising for a decade, that we had been obtaining wide distribution, that we had been fostering new uses for this fruit.

Next year should be a big crop year in the country as a whole. The money is going to be in big prunes. Plant food, good pruning, and an ample supply of moisture, will do more to give us big prunes than any other factor.

The Pear

We need a much wider distribution of our pears. Unfortunately, a very large percentage of Oregon pears are sold in New York and Chicago auctions, with minor amounts going to cities like Philadelphia, Boston, St. Louis, and Cleveland. The smaller markets of the country know little about our fruit.

The California Pear Association tried a campaign in advertising this past year with interesting results. They chose the two markets of Philadelphia and Boston, concentrating their advertising in those cities and did not advertise in any other places. In New York the consumption dropped from 35% last year to 34% this year. In the rest of the United States it dropped from 46.9% to 38.8%, in Chicago, the consumption dropped from 9.6% to 7.9%, but in Philadelphia, the constumption increased from 4.6% to 9%; and in Boston from 3.9% to 10.5%. Showing very conclusively that advertising pears will pay, just as advertising oranges, raisins, prunes and apples is paying at the present time.

California and Washington growers are also finding the best money from handling pears comes from pre-cooling and cold storage of the fruit before it is shipped. That fruit inferior to ours, will out-ship and out-keep ours when so treated.

The Small Fruit Industry

The future of the small fruit industry is going to depend upon a diversified outlet. We should avoid the centralization of the berry industry into one or two lines, because this policy is dangerous. We will have lean years, and some of these firms might be in financial difficulties and unable to handle our stuff. The dried berries, juices, canned and fresh product, should all be pushed to the utmost. By so working there should be little danger of an oversupply, if wider and new markets are secured for our products.

Mr. Minton: (This was an interruption of Mr. Lewis speech.) Canners got a reduction on two hundred miles. It used to be seventy-five miles.

Mr. Roberts: Would it pay to thin the fruit?

Mr. Lewis: I do not know whether it would pay to thin by hand shears or not. I would like to see an experiment made.

Mr. Roberts: There is quite a range in prices between the large and small sizes.

Mr. Lewis: Yes. The prune game is just like the apple game. You can sell big prunes long before you can sell small prunes and the same thing applies to the apple.

Pres. Pearcy: The final number on our program is "Marketing the Dried Prune," by H. E. Newhouse, Vancouver, Washington.

MARKETING THE DRIED PRUNE

By H. E. Newhouse, Vancouver, Washington

Mr. Chairman: All the other people came up here with papers and I feel out of place because I have no paper. I am merely going to make a few remarks.

There is no great enthusiasm along any line of farm products. The marketing of the dried prune is done in two ways: First, the independent concern and second, the co-operative market, which started in California and spread into Oregon. There are advantages in both ways. We are more sober now than two years ago. We are determined that this is the only way to have the solution to our problem. The grower gets the money on the spot when he sells the goods himself. One cannot expect all the money at one time in a co-operative business. Our growers must realize this. It is hard to realize it.

There are two advantages in independent marketing. You take no risk in management and no risk in shipping. There is a risk in co-operative marketing. The prune growers sold last year for fifteen and sixteen cents a pound. The man that sold early did not lose but the man who bought prunes early got the high prices. This year in Yakima, they formed a loose organization, pooled their apples and sold them f. o. b. These are the advantages under the old method. The disadvantage is that the grower does not know the market conditions. Under the old system the untraveled grower does not and cannot know the market and selling blindly is not scientific selling. He ought to know what the goods are worth. The organization knows the value and would help him. Good business now is the buying of prunes and selling them for as high as possible. The disadvantage is that the grower loses the goods too soon. We are positive of this. We believe that the grower should trace his goods down closer than he can when he is independent. There is the elimination of the unnecessary people—the speculators. They take the goods and do as they please with it. They sell and resell and the price gets so high that people do not buy. Then people say that there is an overproduction of prunes and they will not buy. We must get the goods where they are low enough in price for the people to buy. Mr. Lewis and I met with twenty-five aldermen in Chicago. They were just common ordinary people. They met with the fruit growers. When we got up on the floor, they asked us why prunes sell for thirty-five and forty cents a pound in Chicago. "Are you to blame?" We said, "No." Then they opened up. They knew what was wrong. There is one building in Chicago that has one hundred and ninety fruit growers in it and each one is in a two by four office. They called attention to the enormous prices of goods. One trainload of apples was sold thirteen times between Yakima and Chicago and then the apples were frozen. California has a commission on Agriculture, and California is ahead $200,000,000 because they have their growers organized. They may be tumbling down about us but eventually they are right. Our people are poor and they cannot pay the price of the prune at thirty and forty cents.

Now for the disadvantage of the co-operative market. For one thing, too much of the goods is put in the market at one time. We do not apply the market as other business men do. Hundreds of cars of apples were rolled into the eastern markets. They thought that they would be sold. But the east became overstocked. The East began to think that the West was covered with apples. What happened to prices? What happened to supply and demand?

In September, an independent concern began to buy the prunes. They bought seventy-five per cent of all the prunes in the association of Clark county. Two days later, California opened up. The Oregon growers were notified by California, and they made prices. Their price was a half cent less. We were notified by the Oregon office that California and Oregon had named prices. The result was that the price became twelve and a half cents f. o. b. cost here—a difference to Oregon of eight cents. Representatives came from the East when prices came down. They were able to make a profit by offering less than we were making. Then we really began. Orders began to come in. We sold at ten and ten and a half cents. We turned down a number of cars. We sold all we could. Still the independent firm held on. Then the prices dropped, and a weak spot in the market began to show. We have not sold a prune for a long time. Yesterday I could have gotten ten cents and now I can only get nine and a quarter cents a pound. This dropping of the price of prunes is continuing in the market. I have people coming into my office and asking to sell prunes. Here we have one-half our prunes left in the market. Let us reduce the price. That is the worst thing to do. The average grower does not know the market. Does your unorganized man try to sell prunes? He is not selling prunes; he is breaking down the market. He does not know what the market is. San Francisco wants to buy all of our prunes. It is not a personal attack on the independent picker; it is a matter of organizing and controlling the market waste. Try for a living wage and do not fear that the trees will not be worth anything at all.

Whenever I say anything to you, I am on dangerous ground. We are small and have not the problem that you have. We can do things that you cannot do but anyway it's time to begin because you have a more serious financial problem and organization problem than we do. We are loyal friends to you. We are with you heart and soul. There is such a thing as state alliance. We wish you well. We saw this problem this year. We are going to borrow money from the banks in town. If you go and borrow money, we will have to pay the interest and interest will have to be very hard. We are going to try and not borrow money except from the banks. This is a problem I put up to the board. Pay half as the cars are sold by the organization and do not let the individual borrow money. We have many growers on this basis. We have growers who have more on the first payment than you have on the entire crop. If it had not been for the association, you would have 1920 prunes and you would not have had five cents for prunes. The 1922 crop is going to be put on the market absolutely bare. We are optimistic for next year. It (the crop) will be moved away from the cost better next year. That is why we are optimistic. You ought to organize the little growers. By all means, nobody realizes better than Mr. Lewis the need for money. Last year we never sold a prune in Canada, nor have we this year. Canada uses all California prunes. We cannot sell our prunes in St. Paul because California sold there, too. But we have to do it or we cannot keep our market for prunes. The problem is here and has to be solved.

Have you any questions? I will be very glad to answer them, if I can?

Mr. Ebert: How much have you been able to pay on the sales?

Mr. Newhouse: Roughly four and a half cents. We borrowed on the basis of two and a half cents. Our sales are not as much as those of Oregon.

Pres. Pearcy: How about thirty thirty-five?

Mr. Newhouse: We called them thirty forties. We are grading so that all thirty thirty-fives are thirty forties and are put on that basis. Some will eventually be twenty thirties and will be put on that basis when the grading is finished. Some growers have come to the realization now that there never was a twenty thirty grade.

Mr. Roberts: Do you think that a success can be made of shipping green prunes in Western Oregon and Washington?

Mr. Newhouse: Yes, but not so very well—not so well as in Eastern Washington.

Mr. Ebert: I sold five hundred dollars worth of dried prunes green and shipped them on ice. I packed them in five pound boxes. There are four of these boxes in a crate. The crates were braced in the car and were on ice. My bill was one hundred and thirty-two dollars which was more than the prunes came to. I paid for icing five times.

Mr. Lewis: Prunes which are sent from The Dalles to England bring twenty to thirty-four shillings per box. If the rain affects the prunes, they are not good.

Member: As to green prunes, I wrote to Yakima to inquire the price of prunes shipped in a suitcase. I will state that the Earl Fruit Co., said to leave the green prunes alone as they would not stand up under the shipping. They have shipped prunes that way but they refuse to do so any more. I have shipped a few in that manner, in small lots, for a short distance and they went all right. I jammed a suitcase full and when closed, it weighed eighteen pounds. I sent such a one to Idaho.

Mr. Newhouse: The railroad claims that they will ice for twelve hours now.

Member: I would rather have prunes a little over ripe than under ripe when shipping.

Mr. Newhouse: Some years it will not be feasible at all.

Mr. Reuter: Have they received ten cents for twenty thirties?

Mr. Newhouse: Yes.

Mr. Minton: If you want the minutes for this meeting, you will have to pay your dollar and become a member.

Pres. Pearcy: The meeting of the Oregon State Horticultural Society is adjourned to meet in the office of the Secretary, 318 Chamber of Commerce building, Portland, Oregon, December 5, 1921.

Berry Conference Report

BERRY GROWING IN THE PUYALLUP VALLEY

By J. L. Stahl

The Cuthbert will usually produce three tons to the acre. That is when the berries are grown most intensively. The Marlborough is a good producer and comes early, therefore is a good berry to sell fresh, and the quality is good. It is a good deal like a piece of old boot, isn't very good. The Cuthbert is the best flavor of the four varieties I have mentioned, and is the one berry the canneries call for more than the Antwerp, King, or Marlborough. The later plantations being made in and around Puyallup and Sumner are the Cuthbert variety.

I picked out four typical soils in that valley on which berries are commonly grown (showing sample). One that is commonly called the Cuthbert soil, a light sandy loam. Really I believe if that soil was a little heavier, I don't mean heavier in weight ,but had more clay, it would produce a higher yield than we ordinarily get. This is a sandy loam, the soil on which most of our Cuthbert berries are grown.

The heaviest soil we have in the valley on which we grow some of our other berries, particularly the Evergreen blackberry, is the heavy clay. Some of the Evergreens are also grown on the muck soil because we have a great deal of muck soil, and the raspberry doesn't do so well on that soil as does the Evergreen.

The shot clay soil is more common on our first bench land, adjoining the valley. We find some plantations within the last ten years being made on our first bench, and this type of soil is an excellent type for either our red raspberries or Evergreen blackberries.

The muck soil holds moisture a long time during the entire season. The sandy loam is apt to dry out; also the clay soil. The shot clay holds moisture a little better than the sandy loam where well cultivated. But we practice clean cultivation during the summer until after the harvest. Then we stop cultivation to try to ripen the canes as much as we can before the fall rain starts.

Our system of growing berries is something like this: The plantation is laid off in rows seven feet apart. That is the common distance used for planting the berry platns. The red raspberries set 30 inches apart in the row, that requires about 2800 plants to the acre. We run out a furrow and set the plants in that furrow at a six-inch depth, so that the root system is in the ground four to six inches deep. We cut off the cane so it is only about one or one and a half feet high above the crown of the plant. We use that stub for holding while we are putting the plant in the ground, and quite a common system is for a boy to go along and drop the plants; he can drop two rows on each side, about 30 inches apart, then two planters will come back up and draw the dirt in with their feet and firm the soil around the roots of the plant.

Some growers like best to use a spade. Make an opening, put in the plant, then force the soil closely in contact with the roots with a spade, but the furrow plan is more commonly used. Setting the plant is very important. Be sure that the dirt is well firmed around the crown of the plants, and the roots of the plant.

After we have them set, the plants will look like a row of sticks down the row about that high (measuring 1½ feet). That serves as a guide in our cultivation, and we start right away. Some growers plant in the fall, some in the spring. We like March best to plant in our valley. We do not check plant. Just put them about 30 inches apart. The first season the plants are grown without a trellis. Usually they will grow about three to four feet tall; we will have three to five canes about that height by the end of the first growing season. Sometimes when the soil is in very good condition and will not dry out too much in the summer time, we will run one row of potatoes or a row of kale in between our berry rows the first year.

We do not like to double-crop permanently. Do not like to have trees planted among our berries, because we are trellising our berries, and the trees must necessarily be headed high. We cannot in that way have an economical tree; it soon interferes with the cultivation of our berries. I know some of the older growers did recommend it, but we are discouraging it as much as we can. We do not consider it a good practice with raspberries or Evergreens.

After setting the plants we continue cultivation about once in three weeks, until about the first or the middle of May, and then we cultivate once in two weeks or ten days, during the growing season; that will be until about August 1. About August 1 we stop cultivation, then in the fall we plow towards the rows. This is chiefly for drainage purposes, to get better surface drainage. Continue plowing until we get entirely across the area between the rows. We will run about three furrows from the center so that we have a wide furrow in the center and the soil thrown toward the plant row. In that way the fine soil that is thrown toward the plant or hills keep down weeds between plants and hills and the dead furrow in the center serves to carry off surface water from our heavy rains. This fall plowing is usually done about November.

In the spring we plow away from the plants, in February or early March, leaving the plants on a little ridge, about three inches high. When we plow near the plants we plow just as shallow as we possibly can, and after we are out between the rows we plow deeper, sometimes as deep as 7 or 8 inches, but near the plant just as shallow as we can. That leaves the plants on a little ridge. Then we come to the hoe. We hoe out between the plants in the row, and then we will make another hoeing about five or six weeks after that spring plowing, which is usually the latter part of February or early in March. Then about five or six weeks later, hoe out again. That makes two hoeings. Some of our growers even make three hoeings, but we like to make two. That keeps the plants good and clean of weeds, grass, and then at about the second hoeing we also sucker.

We come through and thin out the young shoots when we have six or eight young shoots about eighteen inches high; we retain them for our next year's crop and keep out the later canes that develop. In a three or four-year-old plantation we often have twelve or thirteen produced in our hill. We like to keep just the number we want to produce next year's crop; six to ten new canes is the most we like to leave. That will vary with the plants. Individual berry plants vary just as folks. Some have a great deal of capacity for work; some do not. Sometimes we will find a portion of these canes are winter killed, and we will have to take a few of them out. Oftentimes we do leave two or three extra canes over and above the six to ten in case we have some injury, so that we have from six to ten which will bear a crop next year.

After the first year, that is, beginning the second year, we like to put up a trellis. We believe in the trellis system of berry growing. First, because we believe it is easier for the pickers. In fact we know it is easier for the pickers. We have tried out experimentally, allowing canes to grow upright without any trellising, and in adjoining rows had them woven to the wire, and invariably the pickers, if allowed to select their own rows, if we didn't assign them to rows, would take one of the trellised rows, because the berries are right where they can reach them. It is true that the early berries come near the tip. Even so, with the early berries coming near the tip, we cut off from twelve to fifteen inches of the tip of the canes after it is woven to the trellis.

I have a little model showing one system of trellising. These canes have been carried around and are more or less broken, but with this plan we have cross-pieces. We have four wires, commonly two wires will do just as well where this plan is used, and we do not use cross-pieces if our posts are thick enough, where we use the ten-inch post, as we commonly do, seven feet in length, put two feet in the ground, standing up about five feet. These posts set two rods apart in the row, thirty to thirty-three feet apart, we do not use the cross-pieces.

But if we have a six-inch post then we put on a cross piece, so we have our wires fourteen or fifteen inches apart for our trellis. Then we weave them on these two wires, number 14 wire for red raspberries. Put it about four to four and a half feet high. Our experience is if you put wires too high, the berries will not be picked as readily, you will not get the yield as when you put the wires this high (indicating about four feet.) Because we use women and girls for picking, and if we weave the canes higher, the wire is apt to push up no matter how well you have it strung, and the canes after they are woven will be considerably higher, and the fruit after it sets will be higher than the wires after they are strung. So we are careful not to place those wires too high. And by weaving, divide the hill, carry half the canes on one side and half on the other. The canes are all pulled on the outside of the wires, carried up over the wire, down and on the near side, then tied with a string when we started weaving at the end of the row. After that no tieing is necessary the entire length of the row. Usually will take about three canes, carry them up over, down under, and tie them, take three more, carry up over, down under, and under the canes just ahead.

You can see this plan of weaving is very similar to the manner of weaving baskets, over and under.

The new canes are allowed to grow up in between, and there is a space twelve to fourteen inches between those two wires. The reason we dare not have the wires farther apart, is that we use horses for cultivation and if we use a small tractor we are apt to get this caught and tear down the trellis or tear off a part of the harness. We have tried from 24 inches to nine or ten and we like the distance of about 14 inches between the wires. The new canes growing in between, are kept out of the way of the pickers. The objection to this double interweaving is that some of the berries come on the inside, midway between and only the careful pickers will get them. When we use this plan we go through the field before the harvest season and put in two or three spreaders between the posts, about every 12 feet, they will keep the wires spread apart and the pickers can see the berries and in that way get them. If we put in the spreaders early in the season we will tear down the trellis in our cultivation.

This is one plan that is used to some extent. Another plan is just weave on one side, allowing the one wire merely to hold the new canes in place. The objection to the single wire in weaving is that you are crowding your canes a little more than you will with this plan. If you have plenty of wire the lower wires will aid in holding canes in place but with double wire interweaving, it is not necessary to use four wires.

There is another plan, just to carry the canes instead of weaving them, to a wire and tieing each individual cane with a string. That requires quite a lot of hand work even more than the weaving. Some folks think this is considerable hand work but this is nothing as compared with tieing the individual canes to the wire. That practice has been carried on for years, and some growers still do that, using a heavy hop twine. After the fruit sets and becomes ripe, the canes will lean down so that the fruit can be picked.

Regarding the system of trellising, I always say that the method of trellising is a good deal like a suit of clothes, one man likes one brand, and another man likes another. It depends on which fits your particular conditions better. If we had this many berry growers together at our meetings, we would have almost as many methods, and every man would think his was the best. The most common method that we have is some method where weaving is practiced. This two-wire weaving is being used more than it was five years ago. The one wire weaving system has been used for several years and probably will continue to be used.

After the harvest system, we cut out the old canes, allowing the new canes to stand between the wires until the following spring. We do this in February just before the buds start in spring, then the canes will bend without breaking. If we weave in the fall, the canes are more apt to break. Our reason for cutting out the old canes in the fall right after harvesting is that we think that by taking out those canes, we have a better circulation of air and light and the new canes ripen up earlier than when we leave the old canes intact in the trellis.

That is where we have the worst winter injury, where we do not cut out the old canes until next spring. We also get rid of some of our cane troubles, burn them up as soon as we possibly can detect them in that way.

We have been practicing at our experiment station the past two years, when we cut out the canes, cut them about two feet above the ground, leaving that stub. Then we will come through in the spring and break that off clear down. If you try to cut out the old canes right after harvest you will have to leave a little stub because that cane is not entirely dry. Then go through on your hands and knees next spring and break off that stub, or else leave a stub that is a fine place for plant pests to harbor over the winter. Instead of that we like to leave the stub long enough so we can come through, pull the cane off without getting down on our hands and knees. The Jap gardener will but we don't like to.

We set the Evergreen blackberry about a rod apart in the rows with the rows 7 feet apart. The first week I was at the experiment station, Mr. Paulhamus and C. J. Stewart came out to look the new horticulturist over. We had never met. Mr. Stewart was a berry grower at Monroe, Washington, and was one of the originators of the Puyallup & Sumner Fruit Growers Association, I think he was the first manager. He continued to grow berries at Monroe known as the Great Northern Fruit farm. They called at the experiment station about ten or eleven years ago and we went out to the berry fields. Mr. Paulhamus was a busy man as he is now and he and Mr. Stewart and I looked over the berries and Mr. Paulhamus took off his hat when he came to the Evergreen blackberries and he said, "I take off my hat to the Evergreen blackberry, that has been the berry that has made more money in the Puyallup district than any other berry." I do not say in the Puyallup and Summer district they are growing more raspberries, but at Puyallup we are growing more Evergreens and that is the one berry that is there to stay. We secure yields of about six tons to the acre, often seven to the acre, so you see it is a paying crop.

We set the plants sixteen to eighteen inches apart, the rows seven feet apart, and use a method of trellising something like this (illustrating with model). The new canes may be carried on a trellis about two feet in height in the summer, and the following spring, in February, carried up and put on a trellis about four feet in height, a double wire trellis. The upper trellis on which the bearing canes are trained is made of number twelve wire, the trellis on which the new canes are trained can be made of number fourteen wire. Number twelve wire of course being heavier, it takes more pounds of number twelve to trellis an acre than it does of fourteen, because number fourteen wire will go a good many more feet to the pound. For that reason we do not have the heavy strain on the trellis where the young canes are trained, and can use the lighter wire.

We hold that trellis in place and allow a leverage for the canes, a support for the canes by means of cross pieces. These may have a little hook on one side and staple on the other so that we can just lift up the hook, throw the cross piece to one side to our training, and the cross piece always is on the trellis, held there by the staple. Oftentimes we use a cross piece that has been notched in two places. These cross pieces for the bearing trellis are 20 to 22 inches in length, in the trellis for the Evergreen blackberries, for the young canes about 14 inches wide. The object in having the bearing trellis so wide, is the fruiting arms that are produced during the summer are so long that if we have narrow trellis, of twelve inches, we will have a great many of those side arms broken and the fruit will not mature. They will break down. If the trellis is wide, they will grow out materially.

Some of the growers instead of training the new canes underneath, use eight foot posts for trellising with two feet in the ground and carry the new canes up overhead, up between the bearing canes, so the picking is done here, the new canes are carried up between the bearing canes and overhead during June, July and August, in February they are dropped to the lower trellis. That is the plan that is being used quite commonly with some of our later plantings in the Puyallup Valley.

The object of carrying the new canes overhead, the canes mature the wood better, are hardier when carried up than on the trellis underneath, and go through the winter better. In 1919 we had adjoining fields, where the canes were carried overhead, practically no winter injury; where they were carried underneath, practically all of the canes were destroyed by winter injury. The winter injury that we suffer more from than any other time is October and November. Our heavy freezes usually come then, or even December when the canes are still not mature. If we can find some way of hardening those canes early, by cover cropping, or exposing them to the sun and the air as by this overhead system, we want to do it. Some of our best growers are now practicing this overhead system. The disadvantage is that it is a little hard to get them up during July and August. It is easier to drop them, than it is to carry the new canes up to the bearing trellis.

W. S. Brown: Have any of your growers practiced this same system only simply training up one set of young canes the first year to this lower trellis and allowing it to bear there, sending up the next year's wood to the upper?

Answer: Not with blackberries.

Remark: This was done out at the asylum grounds.

Stahl: Our method of cultivation of the Evergreen and the raspberry is practically the same, except that we allow a few more canes for the Everygreen than for the red raspberry. We allow from ten to sixteen canes for bearing the crop of next year on the Evergreen. We have one post between every two plants. The posts that we have, eight to ten feet, we like to have one on each side of a plant. Takes twice as many posts for our Evergreens than for red raspberries. We have a much heavier crop and more strain on the posts.

Fertilization

We use practically the same method of fertilizing that you do here. Where we use a commercial fertilizer we like to have about a 2-10, or a 2-8 or a 2-4 combination. On our sandier soils we believe in a great deal of phosphorous. Where we might ordinarily use a 2-8 fertilizer, we like to use a little more phosphorous because we find that the plants respond on that lighter soil where considerable phosphorous is used. One common practice that our growers are using now is the combinaty of poultry and berries.

We talked that for years but it is only during the past few years that our growers have taken that up extensively. Almost every berry grower, 75 or 80 per cent, now have some poultry in connection with their berry plantation. At certain times of the year they let the poultry run in the berries. The poultry help cultivate the hills, keep down weeds and grass between the plants, and also fertilizing. One man a few years ago said "If my poultry did not lay an egg, they would pay for themselves in the benefit they do the field, in fertilizing and scratching. I consider that the eggs they lay are clear velvet." So we are using fertilizers now that have hen manure as the chief fertilizer and supplement that with phosphorous and potash.

Q. How much do you pay for your hen manure?

A. We don't have to pay for it as a rule, the grower produces it on his place. I don't know of any occasions where hen manure is sold. We have used sheep manure as the chief fertilizer until the last year or two, when poultry has been raised extensively. We consider if we could get sheep manure at $6 or $6.50 a ton, on the track it paid to apply at least once in two years, then use commercial fertilizers the alternate year.

Q. Do they distribute the chicken houses over the farm?

A. No, usually they are away from the berries. Sometimes they are close enough so they can use the berry field as a separate run. At certain times we dare not allow chickens to run. When there is a shortage of green stuff, after a heavy freeze where we lose considerable kale and green stuff for the poultry, if we have a shortage of that, and we turn the chickens in the berries in the spring when the young shoots are coming up, they destroy them, so we keep them out at that time.

When we put on manures we plow them under. We get better results than if we leave them lie.

Q. What effect will it have if you put too much on?

A. We haven't had that trouble yet. We do not like to apply any fertilizer right around the crown of the plant. If the manure is good for plants it is good for weeds and you will get more weed and grass growth. Put the fertilizer out where the roots are produced, they are not under the plant, they are out away from the plant.

Q. Do you practice irrigation on your Evergreens?

A. We have not, possibly we ought to. Ordinarily the big trouble we have with our Evergreens is that they fruit a little too late, so it rains too quick for us. We don't need irrigation on our soils where the Evergreens are grown. We put them where the soil is the wettest.

Q. How many canes do you leave in Evergreens?

A. Ten to sixteen.

Q. How long after planting Evergreens before you get a paying crop?

A. About three years. We will get a light crop the second year, a little heavier the next year. The second year we would get about 25 crates, the third 100, a crate weighs about 20 pounds, eighteen of berries. Cannery crate weighs 24 pounds. The fourth year they give us a little heavier crop, the fifth year we can expect five to seven tons to the acre.

Q. Do you have any trouble getting pickers for the raspberries?

A. Not very much. We are between Seattle and Tacoma, and we sometimes have a little trouble, but not ordinarily. We like to have our strawberries, raspberries and blackberries coming on at different times so we can use the same pickers. We like to pick our raspberries for shipping every day when the crop is at its heighth. After the first week we usually start picking every day for our shipping berries, and for our canning berries, every other day.

Q. Do you start your new plantings with tip plants or yearlings?

A. The Evergreens we start with tip plants, or transplants either one, and our raspberries of course they are just suckers from last year's growth. The young plants of raspberries give the best plants.

Q. Do you have trouble with shoots coming up from the roots of the Evergreens?

A. We do not have very much trouble. They will come up some. Sometimes they will start from a root cutting. Sometimes seedlings will come up, but we cultivate often enough to keep them discouraged. It will usually take from eight to eleven cultivations a summer. On a seven or eight-acre tract which we consider about as much as a man ought to tend, and tend it right, he will need extra help at training season for about two weeks. One man can train, if he is a good fast man, about a third of an acre a day. He will need extra help at picking time. Usually figure on about six pickers to the acre for harvesting.

Our canes are seven to nine feet, by training them down they will sometimes go three feet on the wire. Prune them back from twelve to fifteen inches from the tip, after they are trained down. We tried cutting off at five feet first training down, and we haven't had the difference in yield that I heard mentioned this morning. We have had almost the same yield where we cut them back. That may be a soil difference. If you cut back to four and a half feet and the buds start pretty high up, we would expect to cut down the yield. We do not like a cane too tall, I would prefer seven foot to a ten-foot cane for the reason the ten-foot cane ordinarly the buds will not start until about three feet from the ground. If you get a cane the size of my finger, I like it. If you get them too large, they are sappy and are more apt to winter injury.

Q. What did you have to pay for picking Evergreens and raspberries.

A. We paid 30 cents for Evergreens and 5 cents bonus, and 40 cents for raspberries, with a 10-cent bonus. That is for an 18-pound crate. We paid the same for canners as for shippers last year.

Q. What did you get for your raspberries?

A. The first pool brought considerable but the later pools did not. We probably run for our shipping berries, close to $3.00 a crate, perhaps $2.25 to $3.00, and 6 or 7 cents for the cannery berries, so it will average pretty close to 10 cents a pound, about 5 cents for the Evergreens.

Q. How far do you ship your raspberries?

A. Last year we shipped to Chicago, Minneapolis, St. Paul, Lincoln. These berries are precooled, by the pipe system, are put in a cooling room, cooled down and then put in the car. There are two systems used. One association at Sumner is cooling the berries before putting in the car. The Puyallup and Sumner Association put their berries in the car and then cool them by carrying a cold draft of air through the car.

Q. Do you ship Evergreen berries in the green state East.

A. Yes, some were shipped this year, sent as far as New York and reported good returns for them. The Evergreen blackberry when grown in the garden or berry field is entirely different than the Evergreen grown on the hills. When we harvest the Evergreen in the field, we do not harvest it just as soon as it is black, but wait until it is almost soft. Until all the little droplets are plump. Until the dimple is gone, where there is a little hole at the end of the droplet. Then we harvest the berry. It makes a difference of about twice the size of the berry, a difference in the quality of the berry, if the berry is left until it is ripe. It will get black from a week to ten days before it is ready to harvest.

Q. Have you noticed any difference in the seedling blackberry?

A. Some individuals, yes. We are doing quite a lot in picking up as many of these different types as we can.

Q. Do you find the broad leafed type or the narrow, does the best?

A. We have two types commonly grown. One real fine leafed and another just medium. We have been growing a very broad leafed one, similar to the ones you had at Corvallis but the berry is softer than the ordinary wild Evergreen.

Q. Do you grow the Himalaya?

A. Not now. We did grow it considerably. Most of our growers have taken that out because it is so subject to crown gall. Outside of that disease it is a harder berry to train than the Evergreen, is a softer berry. Our canners like the Evergreen the best.

Q. Do you find crown gall a serious pest?

A. Yes sir, it is one of our most serious pests. Quite a lot of crown gall the last year or two. Growers claim they got the plants in Oregon a year ago.

Q. Does the Evergreen grow wild in your district?

A. Yes, just as it does here.

Q. Are these that you cultivate the same as the wild?

A. Yes.

Q. Was the car shipped to New York—were the berries left on the vines until they were fully ripe?

A. That is what the Association claimed.

Q. How many days in transit?

A. Five or six days.

Q. Do you grow any of the straight cane?

A. We are cutting them out on account of disease. We do not have the yield that we have from the Evergreen. Have more anthracnose and more crown gall.

WHAT I THINK OF THE BLACK CAP

By Ed West

About the only way I can get by is to show you how we grow our berries. We have been in business now for about twelve years, have tried out about every scheme we could get hold of and have finally come down to the tieing up system and we consider it the best. We have about twenty-eight acres. It is quite an expensive business to handle them. We plant our berries 4x7, and by this system of tieing up your vines will not spread over the ground.

Some men talk about moles and mice making holes. That was our first great trouble, and winds dried the berries out. But with our cross cultivation, you cultivate over all this between the hills and that eliminates the drying out. With the plant tied up in this way it enables the picker to stand up straight while they are picking. With the vines opened up, they fell down and you had to bend over to pick them. You can leave a great deal longer cane to grow berries on.

We cut ours off the last of May or first of June, from twelve to sixteen inches high, getting these shoots out here. Then you notice the heighth we cut them, later in the season. We make an average of about three cuttings, the last of May and first of June. We start in tipping as soon as it thaws out. We just make two cuttings. In May and June we cut about three times because the sprouts don't come up even. Cut off not to exceed six inches of the sprout. With this system of tieing up we find when you cut your vines off we use a hook in this shape, and draw the canes down to the middle of the row then we scrape them up and follow through with a burner and the bundles are caught up and disposed of.

We figure the cost of raising about fifty per cent. We tie them up anywhere from the middle of December to the last of January. We leave them spread out until that time. Leave them tied until we cut out the old stocks. If you tie them too close you smother the inside buds.

The extra berries you will save by having them where the picker can get them easily and will more than save what you smother out.

As to diseases, we haven't had any to speak of. We grow the Munger. We did grow the American but it proved to be too soft a berry. I think the Kansas and the American are practically the same thing. They are both a soft berry and when you come to make a dried berry it crumbles.

With us the Plum Farmer ripens too much at the same time. We pick our berries about four times in the season. Go over them about every three or four days, and pick as many as possible. If you leave too many ripe ones on the vines, it causes the others to be smaller.

We grow the Munger because the cannery seemed to prefer them up to the present time. We leave all the canes that grow in the hill. This is hardly an average hill, it is about five years old (exhibiting berry vine).

In planting your plantation, the first year you should give very good care, but what we call the baby crop—a good many people gather it—we don't believe you should. If you will cut them off about two inches from the ground, and save no berries at all on your first crop, you will get bigger vines following that. They will set all the berries they can hold, and it seems to retard the vines. I wouldn't pick any crop the second season. You would only get about a fifth of a crop. They are low down. Of course if you only had maybe an acre, you might get them picked; but we have quite a big acreage, and our help won't get down to pick them.

We use a 3-10 bottom plow, a tractor plow. We make two rounds in each row, back furrow to start in with. We plow up about eight inches of the vines, then we go through with a grape hoe and that finishes it up right to the vines. Then we let the ground lay and go on to it with the disk and disk it flat. We may reverse our disc, that levels them down pretty well. Then we take the cultivator and cross cut the patch. That cuts out all of the weeds in the rows. If you don't cross cultivate you have to use a hoe.

Last year we used a combination of a 3-10 bottom plow, followed by a disc, then used a spring tooth and I sowed vetch and rye in my berries, and the rye was up an inch high before we had any rain.

We have a kind of brown clay loam. We should get around one and a fourth tons the third year. They should run from one and a half to two tons after that according to the season. Up to two years ago, our berries were all grown among our prune trees. Naturally we didn't get the yield we should have, but like a great many others we used them for a cash crop. But we have some nice trees now, and I think in another year we will have a good prune orchard.

Q. What fertilizer do you use?

A. I have used some 2-10-2, I didn't see any result from that. A man told me he got stung on it. At that time I didn't know what 2-10-2 meant, only I knew it meant about $80 a ton. I dug up a patch this year that was twelve years old, and it was in pretty good shape yet. I don't think you should run them more than ten years. If I was putting in another patch in prunes I would put in two plants to each hill, and take them out in about six years. You will get the extra stock and extra amount of berries in a short time. When plants get older the vines get too small.

We have gotten anything from 2 cents or 3 cents less than it cost to raise them, up to 20 cents a pound.

Q At what season do you cut the baby vines the first year?

A. In February. We don't like to monkey with them after the buds start in the spring. We have our tractor fitted up so it doesn't hurt the laterals. We put sacks on the horses' front legs, soaked in linseed oil so they won't tear the vines.

The best thing I have found is to go to an auto shop, find an inner tube out of a cord tire, and that will last for several days. Put it right on your hand to use in holding the vines up into a bunch to tie them.

It cost us 2 cents to pick last year.

If I hadn't known the Oregon Growers Association was going to operate, I would never have put out any more berries, but as it is I am putting out some more gooseberries and intend putting out fifty more acres a year from this coming spring.

SUCCESS OF THE BLACK RASPBERRY IN OREGON

By W. S. Brown, Oregon Agricultural College Experiment Station

At the present time, growing of the black raspberry is confined to a comparatively small number of sections in the state. The Springbrook and Newberg districts lead, by a large margin, all others. Around Eugene, Salem, Corvallis, and a few other places, some black raspberries are growing. Generally speaking, however, the blackcap industry of the state has never measured up to its possibilities, and is at present behind some of the other small fruits.

Unfortunately the figures on acreage, yields, etc., obtained by the assessors of this state and by the United States Bureau of Crop Estimates, include red and black raspberries along with blackberries in one group, hence it is impossible to give accurate figures on the black raspberry alone.

Taking this group as a whole, the estimate of the United States Bureau of Crop Estimates for 1920 was as follows:

Acres in bearing	4500
Yield per acre	2000 pounds
Total production	9,000,000 pounds

As will be seen by these figures, the yield on the average is much lighter than that which is obtained by the best growers in the state. Yields of from three to four tons per acre of red raspberries have been harvested in the Gresham district, while among the blackcaps, from two to three tons per acre would be considered an excellent yield.

The black raspberry is undoubtedly worthy of more attention than it has received in the past. It makes a splendid product for the table in any one of several different ways; the fresh berries are fine either for sauce or pies, the black raspberry when properly canned is one of the richest and finest flavored sauces that can be obtained from fruits. It lends itself especially to the making of excellent jams, and to best advantage of any of the small fruits, drying out from 20 to 25 per cent of its fresh weight.

The blackcap is easily cared for and requires less hand labor than many of the other small fruits. On the whole, this industry should be encouraged by being more widely advertised. When the merits of the black raspberry begin to be known to the average housewife in Orgon, the prices of this delicate and delicious fruit will increase. The statement is often seen in literature bearing upon bramble fruits, that the black raspberry does not produce as well on the Pacific Coast as does the red raspberry.

This is true as a general rule, but when careful selection is made of soil and slope, coupled with good cultivation, careful pruning, and protection against pests and enemises, and when in addition the fertility of the soil is carefully maintained, the blackcap will in fact, regularly outyield the red raspberry. In the East, the black raspberry is regularly counted upon to outyield the red raspberry.

Four limiting factors to successful black raspberry growing:

1. Varieties.
2. Moisture.
3. Fertility of land.
4. Healthy plants.

Of course other factors enter into this discussion, and a long paper covering the whole field of culture might be written if there were time, but the above four factors will be especially stressed.

Varieties

In a state which has been growing small fruits successfully for so many years, we are safe in recommending four or five leading varieties that have proved themselves especially good for this country. From time to time, many varieties are brought forward, some of which have considerable merit, others of which will not do well under our conditions. The best thing for the grower to do is try a few of these many varieties as a sort of a local experiment on his own place, and to couple with the information he obtains, any further advice he may get from the State Experiment station, or some other growers who may have grown and tried out the variety in question.

The varieties recommended are as follows:

Early to Mid-Season

Plum Farmer—Vigorous, healthy and productive.
Munger—Moderately vigorous, productive.
Cumberland—Strong grower, healthy and productive.

Late Varieties

Gregg—Vigorous and productive but somewhat tender to cold, and somewhat crumbly for a canning variety.

Of the four varieties mentioned above, the Plum Farmer and Munger are the leaders in some sections of the state, while the older varieties—Gregg and Cumberland, lead in other sections.

Purple Canes

These are crosses between the red and black raspberry. The best varieties of the purple cane are undoubtedly the Columbian and Schaffer. The growing of purple canes should undoubtedly be encouraged in some sections of the state, especially in places near large fresh fruit markets.

Moisture

Soil.—The black raspberry requires a deep, rich, cool, moist soil, very well drained. When sufficient water can be added by irrigation, the black raspberry will do its best on sandy loam soils. Under Willamette Valley conditions, however, the plant does best on a light friable clay loam that is fairly rententive of moisture. Under no conditions, should the black raspberry be planted on poorly drained tight clay loams. They will soon die out and will be unprofitable from the start.

Slope.—This should be to the north preferably because the black raspberry should be kept from being shriveled up from the heat of summer and become too seedy. The north slope is cooler and can be kept more moist. In some sections, north slopes have deeper soils than do the south slopes. Good air, drainage is necessary also to protect the plants against winter killing, and to avoid damage from late spring frosts.

Humus.—The more humus the soil contains, the greater will be its water holding capacity. There is nothing that fills the bill better in this respect than stable manure containing more or less straw. The cover crops make a very good substitute for stable manure, especially if a leguminous crop is grown. Oats and vetch sown together in proportions of 30 pounds of vetch to 20 pounds of oats, and then plowed under as soon as plowing season arrives in the spring, makes a very satisfactory cover crop.

Cultivation.—In the eastern part of Oregon, careful and frequent cultivation must be resorted to if the moisture content of the soil is to be conserved. This means a frequent shallow cultivation rather than deep cultivation, because the roots of the plants are relatively shallow, and if the cultivating tools are set deeply, more harm may result by cutting off roots than good may be accomplished by the cultivation. Most commercial plantings are set 4x8 feet so as to permit thorough work either with horses or with tractors.

A word about tractors may not be out of place here. The smaller and necessarily cheaper type of tractor is the one most frequently found and best adapted to the small fruit plantation. Of these tractors, we have two types in general, the track laying or caterpillar type, and the wheel type. It is frequently necessary to get among the canes after they have begun to droop considerably, and in such cases the track laying type proves itself much superior over the wheel type. The lugs on the wheel repeatedly catch the young canes and destroy them or smash them as they grind them into the soil. In addition to having them serviceable, the tractor must have the ability to turn short at the ends of the rows and must be so constructed as not to pack the soils seriously. Most of the work to be done by the tractor is light cultivation, therefore it is a waste of power to get a tractor so large that so much power will be needed in the operation.

Cultivation Tools.—These tools should be carefully picked for the berry plants. They should be so adjusted that they can be set more shallow near the plants than toward the centers between the rows. For tractors, undoubtedly the tandem reversible disks is the best tool of that sort. This means two reversible disks hooked tandem by means of a goose-neck connection. The disks can be set to have both gangs throw in the same direction, or to have one gang throw in the opposite direction from the other. There should be a tilting device so that the gangs should run somewhat deeper between the rows than near the rows. A fine tool to follow up the disk after that has been thoroughly done, is a combination of a plank level, built strong—not heavy—with a Kimball weeder set between the sides of the plank. The depth that the Kimball is to run will be governed by a long lever running to the seat of the tractor. This keeps an excellent mulch upon the land and at the same time keeps the soil level.

Some work must be done, especially in early spring, close to the plants, and for this purpose, nothing is better than the heavy German or nigger hoe as it is called. Care should be taken not to simply scrape off the dirt along with the weeds in the spring, leaving the ground to dry harder than ever, but first to cut off the weeds and chop a good mulch around the berry vines.

Fertility of Land

It is coming to be generally understood by the growers of all kinds of small fruits, that if the soil is not rich enough for the fruit, they must supplement the fertility of the soils in one form or another if they are to get maximum results.

The best treatment for the berry patch is to give it a liberal dressing of stable manure the year before planting. If ten to twelve tons of manure to the acre can be worked into the soil throughout the fall preceding planting in the spring, the growth of the vines is usually such that by the second year, there is quite a crop upon them. If the vines are not fertilized, it is usually the third season before they produce berries sufficient to pay for harvesting.

It must not be concluded, however, that fertilizing after setting is not a good practice. Stable manure when it contains considerable straw is excellent for this purpose, provided it is spread between the rows rather than on the plants in the rows. It should be applied to the soil so that the straw can not swell before spring. In case stable manure is not obtainable, commercial fertilizers combined with green manures is often profitable. It is a fact that nitrogen content wears out fastest in the soils. The job of the fruit grower is to build up the nitrogen content so that he will get a well balanced ratio of nitrogen potash and phosphoric acid. He will know when this is accomplished by the vigorous appearance of the leaves and shoots. As a rule, in this country, we have enough phosphoric acid and potash to provide for ordinary yields, but if maximum yields are produced, they can only be brought about by increasing the nitrogen, phosphoric acid and potash in a sort of a balanced ration in the soil.

In other words, it will do you little good to increase the nitrogen application beyond a certain point, unless the plant also has enough phosphoric acid and potash to build into its tissues, to balance the nitrogen. The berry fertilizers put out by Swift and other companies, are usually good when maximum production is wanted. If one chooses to make up his own fertilizer, he can do so by using a formula of 4 per cent nitrogen—8 per cent phosphoric acid and 2 per cent potash.

A word of warning must be given, however. Every grower must determine for himself, the maximum amount of fertilizer he must apply to get best results. In other words, he will find, if he carries his experiment far enough, that beyond a certain point, the increase in fertilizers will not bring an increase in the percentage of fruit, and that he will be decreasing rather than increasing his net profit by an over supply of fertilizer, just as much as he would by an under supply. It must be remembered, too, that fertilizers are not available to the plant unless the free moisture content in the soil is equal to at least 5 per cent. That means that if a soil contains sufficient moisture for the growth of plants, say from 5 to 12 per cent free water, that the soil will make a ball in the hand, upon pressure, which will easily crumble apart.

Healthy Plants

Planting.—The great secret of success in berry growing is to keep the berry plants growing well and in a sturdy condition. In the Pacific Northwest, blackcaps last indefinitely if they are well cultivated and kept free from plant diseases and insect pests. Many profitable plantations can be found, running from fifteen to twenty years of age. In the eastern part of the United States, it is usually necessary to pull out berry vines at the end of the ninth year because they are no longer productive.

One of the first operations having a direct bearing upon the longevity of the plants is that of planting. When the plants are set, the ground should be thoroughly worked and in fine condition. The plants should be set deeply enough so that the crowns will be at the surface of the ground or very slightly below it. If set too deeply, water gathers about the crowns in the winter and they rot out. If set shallow, the roots dry out and the plants are very short lived.

Pruning.—It is better to have three or four strong new canes to the plant than to have twice that number of weaker ones. This means that all weak canes should be cut out and the good ones thinned down to about four to seven. This will allow the pruner to leave the side branches longer containing more fruit buds. It has been the rule to prune back the side branches of the black raspberry to about four buds, cutting out the weaker twigs entirely. A study of the buds along the side branches convinces one, however, that many of the stronger buds are somewhat farther out on these branches and that these should be used in the production of fruit. It would be folly to ask the plant to produce more fruit than the water supply in the soil would justify, because of those conditions the berries would be small and seedy. Therefore there is better fruit produced when weak parts are carefully removed and even the stronger canes and shoots thinned out to a smaller number.

Plant Diseases and Insect Pests.—This limiting factor is a very serious one and should command the most careful study of every small fruit grower. The subject is one to be treated by specialists in these lines, however, so that I need not mention it further.

Rodents.—Field mice sometimes do as much damage as any of the insect pests or plant diseases. In some cases, their ravages are mistaken for a diseased condition of the plant. One should carefully examine the roots of the plant to see whether field mice have been burrowing under them, cutting off some of them and allowing the others to dry out. Such a condition will soon result in the death of the plant. For a remedy against field mice, the following formula is recommended by the United States Department of Agriculture—Biological Survey:

(1 oz. strychnine alkaloid).
⅛ oz. saccharine—mixed dry and powdered.
Mix this combination with 12 quarts of oatmeal.
Apply to the burrows of the mice or along their runways.

Profits

The profits received from the business will depend upon two factors: First, management and second, prices received.

Management.—One of the phases of good management too often overlooked, is what is called the economic unit of production. By an economic unit, we mean a berry field that can be worked by one man for most of the year's operations. He will have to have some help in harvesting of course, but aside from that, he ought to be able to take care of the place by himself with the aid of a team of horses and the proper tools. Such an economic unit for black raspberries on ordinary soils is about ten acres. When the tractor is available, this unit may be enlarged so that probably fifteen acres can be handled by one man.

Costs of pruning, training and picking are somewhat less than for the red raspberry. On the other hand, the yields in the Pacific Northwest are usually somewhat smaller than yields for the red raspberry, possibly 25 to 33 per cent lower. With the proper understanding of soils necessary for the blackcap, with careful cultivation and good feeding, the black raspberry ought to accomplish what it does in the East; namely, to equal or exceed the yield of the red raspberry.

In the growth of all bramble fruits, the nearness to a cannery or to some city market, must be carefully considered. While the black raspberry will not crush as badly as the red raspberry or Loganberry, still it must be handled carefully from vine to consumer, and should not be located so far from a marketing center as to hurt it or use up the profits in transportation.

Prices.—Money paid for blackcaps is usually about the same as the amount given for red raspberries, both at the cannery and for the fresh trade. With yields a trifle lower than the red raspberry, the prices of the blackcap should be a trifle higher than the red raspberry, and some canneries and some markets are paying a little more for the blackcap.

While black raspberries are very successfully dried, it is true with them as with the other small fruits, that drying is not a profitable way of disposing of the product unless prices for fresh and canned fruit are low. The same may be said regarding the shipping of blackcaps in barrels for jam making. The price received for goods of this sort is lower as a rule than prices obtained at the canneries. However, when conditions are such as to make it best to turn the berries into jams, they may be shipped to some distance in barrels under refrigeration.

In recent years, shipping of fresh fruit either with or without sugar, under refrigeration, has been a way of sending our berries East for use in the baking trade. The baker thaws these berries out and uses them fresh in his pies. This phase of the industry will undoubtedly be more widely developed than it has been in the past.

In conclusion, we may say then that when the soils and the slopes have been well selected, when careful management is given, when profitable varieties are being grown, and when markets or shipping facilities are near, success in black raspberry growing is usually assured.

Discussions Following W. S. Brown's Talk

Q. What are the indications of the lack of nitrogen?

A. A sickly yellow appearance of the leaves, small seedy berries, and lack of vigor in the cane. Weak canes, devitalized canes.

Q. What time would you prune?

A. Some have said, "whenever your knife is sharp," but the best practice for raspberries is the last of February after the danger of cold weather is past. The blackcaps die back at the tops during the winter and if you prune before that time you will get dying of the buds anywhere you prune. From the latter part of February until the leaves come out in the spring, you can prune to advantage. The Logans can be pruned to the best advantage at that time. If you have large plantations, you run some risk in pruning before that time.

Q. Would you prune as heavily in the fall as in the spring?

A. You would have to count on a little die back. That would reduce the percentage of the buds which you left. There has been a sort of rule of thumb of pruning the blackcap which says, we should leave four buds on each lateral. You will find you get good strong cane growth, your best buds are out further, beyond the fourth bud. and for a strip of seven or eight buds possibly. My opinion is this, that you will get better results if you cut to fewer main canes giving your strength of the plant into those and the moisture supply, then go out further on your laterals and leave more of those buds. You will get better fruit buds. You must study the buds you are working with and see what you are getting. Varieties differ in that respect. Some have longer internodes, buds are farther apart and you will have to cut the lateral longer.

Q. Do you summer prune?

A. Yes, summer pruning is necessary to get the form of the black cap and give the strength sufficient to hold itself up and cause sufficient branching to get the maximum amount of fruit. This should come along the last of May. By that time, they have gotten up at least two feet then you can cut off possibly four or five inches and of course some of the vines will be higher than that and you may have to go through twice, if you cut at that time you will get long vines bearing very strong buds. These develop very well before the end of the summer.

Q. Do you cut out the canes any at that time?

A. In some cases where they are very weak I do, but as a rule, all these old bearing canes have been thinned out in the winter so there is nothing left of the bearing wood to be thinned out. The new growth might be thinned but I prefer to wait until February because unless the new growth is absolutely too thick, I find all these leaves are manufacturing food for the roots of the plant, and it gives you a better root by so doing. If you cut out too much you devitalize your plant.

Q. How do you deal with the mole?

A. He is a bad actor. We haven't yet found a real good way of handling the mole. Tried to poison him, and smoke him out with gases, tried to trap him. He is a hard fellow to shoot.

Mr. Bowne: They make a little rosette on the top of the ground, dust it off, open up his hole, take a gopher gun that shoots a twelve or sixteen and set it for a gopher, take a tomato or corn box, a regular grocery box, with a few little cracks invert it over the whole thing. I never did see one yet fail to come up and pull the gun off. They are more accustomed to coming in contact with wood than bait; bark is good.

Q. Isn't it a fact that a mole is carnivorous?

A. No, not strictly. They have found green stuff in their stomachs.

Q. What was the cost per pound of picking blackcaps last year?

A. 1½ cents I think was about the average.

A Grower: In our section about 2 cents.

Holt: We paid 10½ cents for blackcaps, and 8½ cents for red raspberries.

WHAT TILLAGE AND FERTILIZERS WILL DO FOR THE LOGANBERRY

By Carl Aspinwall

I have been asked to talk on tillage and fertilizing of the Loganberry, and I have prepared a paper to that effect, and I can read it and give you a better understanding than I could by trying to talk with you.

I am going to enlarge on this a little and give the methods of cultivation that I use in getting the maximum production from the land.

The three principal factors that concern every berry grower are conservation of moisture, drainage and plant food. I will take up the question of moisture first. During the long rainy season of which the Willamette Valley is subject to, our soil is supplied with an abundance of water and in order to conserve enough of this for the dry summer months it is necessary to give the soil a systematic cultivation.

I start plowing my berries as soon as I can get on the ground in the spring, usually about the first of April. I plow the dirt away from the vines, being careful to plow the last furrow very shallow so as not to disturb the roots of the plants. I then follow with a heavy spike-tooth harrow before the ground has a chance to dry out. After the harrow I use the grape-hoe just skimming the top so as not to injure the roots. I follow this with a four foot disc harrow going twice in a row, and throwing the dirt back against the hills to prevent drying out. I then go through with the hand hoe and get the remaining weeds left by the grape-hoe.

(In regard to the grape-hoe, a good many people condemn the grape-hoe because they say it digs too close and is a hard thing to operate. It is unless one knows how and has some experience, because you have to dive under the hills and unless carefully, will run into the hills and dig them out.)

By this time it will be time to start with the springtooth harrow which I set to dig about four inches deep and cultivate my field at intervals of about ten days until the middle of July. It is very important to keep the ground as nearly level as possible through the growing season. To leave a ditch under the row by not throwing the dirt back against the hills will let the plants dry out and to keep the rows hilled up leaving a depression between the rows will raise the crown head above the natural level of the ground, and also permit drying out. In the fall I plow or disc throwing the dirt towards the vines.

This leaves a furrow between the rows and helps a great deal in draining during the rainy season. A berry field on rolling land is naturally quite well drained by opening up a few ditches with the shovel but for those with berries on land that is inclined to be flat it is difficult to give a proper drainage without tiling which, if properly laid, will allow draining to a depth of from three to six feet, thereby keeping the water away from the plants which if left is liable to drown them.

By tiling, work can be started two or three weeks earlier in the spring and thereby have a much better chance to keep up the moisture. Tiling also air-slacks the ground making cultivation easier and done in better shape. But with the best of drainage, cultivation and conservation of moisture, no plant will do well if not properly fed: therefore, if the soil is lacking in any form it is necessary to supply that vacancy with the kind of fertilizer needed to insure a proper plant growth. Owing to the excessive rainfall of, this valley most of our soils are low in nitrogen and I have found from experience that the appliance of nitrogen in some form is not only helpful but vitally necessary in producing a full crop of vines and berries.

Probably the best form of fertilizer to be had is good barnyard manure as this contains all of the ingredients that the soil lacks besides adding the much needed humus, but for those that cannot get enough good manure will find that one of the best forms of commercial fertilizer to be had is nitrate of soda, this should be applied during the latter part of March to get the best results. Nitrate of soda is immediately available and care must be taken in applying as it is very strong and a too liberal application on the plant is liable to kill it. Either sow broadcast or sow around the hills not closer than twelve inches.

I use from three hundred to four hundred pounds per acre. As nitrate of soda has a tendency to produce soft berries I use superphosphate along with it. I use two hundred and fifty pounds to the acre sowing it broadcast and applying it during February. The use of the phosphate will produce a firmer berry and insure much less trouble at harvest time. Nitrate produces a vigorous growth of vines with an abundance of foliage, berries, growing among this foliage are more or less in the shade and as they get ripe are larger than those growing on vines with thin foliage and no extra nitrogen to feed on. While nitrate of soda does not supply any humus the sowing of vetch between the rows will furnish this deficiency and at the same time furnish a certain amount of nitrogen. Vetch should be sown in the latter part of August or the first of September. The ground should be thoroughly disced to prepare a good seed bed. I then use a thirty-inch disc drill and sow about forty-five pounds per acre.

By intensified cultivation and the use of nitrate of soda and superphosphate I have increased the yield of my Loganberry field by at least twenty-five per cent.

"I did not touch on training and that is very important too. I have noticed a good many yards and probably the big majority of yards * * * weaving vines out in fan shape as it would be well to take up about one-half of them and wind them along inside. Berries can't get out if trained in that style. I train them up in fan shape and weave them in. That gives a bigger surface for the shoots to grow out. Some people believe in training out lots of canes and cut them back to four to six or eight in a hill. Let every cane grow that will come up. It is not a question of the canes but a question of the berries you will get. If you have thirty canes in a hill they will all produce berries if they have something to feed on.

Questions.

Q. What yield do you get?

A. Little better than five tons to the acre.

Q. How old?

A. Eight years.

Q. How well will they last—die off with old age?

A. No. I know patches twenty years old and still bearing.

Q. In regard to your hills, do you go deep or shallow in middle of the hill?

A. Just as shallow as I can.

Q. In regard to tile, have you any trouble about the roots getting into the tile?

A. Tile should not be less than three to six feet deep. Any tile should not be less than three feet deep.

Q. How far apart have you got these tiles?

A. About every eight rows. It depends on land and how much they need the tile, etc.

Q. Do you apply nitrate of soda?

A. Have applied nitrate every year.

Q. Do you consider it advisable?

A. Do not see as it hurts any and certainly helped mine. I know what it was before, and it is certainly a whole lot better.

STRAWBERRY GROWING IN THE HOOD RIVER DISTRICT

By Gordon G. Brown, Hood River

It gives me a great deal of pleasure to be in Salem today. I have just had the honor of being a guest of Mr. Lewis at the Kiwanis club at the Marion and I was especially pleased with the spirit of good fellowship which prevailed there. (Assisted in precooling experiments at Salem Fruit Union, afterwards travelled through Marion county gathering statistics—was impressed with the opportunity for diversification of fruits in this district.)

Hood River has developed the strawberry industry on a very scientific basis. It might be well first to point out what are the characteristics of an ideal strawberry section, and in logical order, it might be worth while first, to discuss briefly the influence of altitude.

It is a matter of common observation that plants of any nature, grown at a high altitude are the ones which are subject to a shorter growing season. The snow lasts later in the spring, and the cold of fall appears earliest. The fruit from those districts necessarily appears on the market last. Hood River has great extremes in this regard. The altitude of Hood River proper is only 100 feet. Within a distance of three miles we have an altitude of about 200 to 300 feet. Within five to seven miles, we have an altitude running from 500 to 700 feet. Within twelve miles, 1100 to 1200 feet and within 15 miles, an altitude of 1500 feet. It has an influence in a marked way upon the time when the strawberries arrive on the market.

The next thing to be considered is the matter of soils. What may be considered an ideal strawberry soil? You will find authorities differ on this subject, in a very marked way. Some authorities figure that a fine sandy loam is the best for the strawberry as a whole. You will find recommendations vary, to the heaviest muck, and you will wonder why there is such a marked difference in this regard. If you analyze these statements you will find that the difference of opinion is simply because the man who recommends, has a different viewpoint, a different variety, and different soil requirements, different times when the berry has to be on the market, some are grown for strictly fresh fruit trade, others are grown for the canneries. So all these considerations must be taken in mind, when we decide what is a proper strawberry soil.

In the Atlantic coast plain, the ordinary sandy loam is considered ideal for strawberry production. In that case, earliness is one of the prime requisites. Down in Florida, they prefer also a very light sandy loam, because a soil of this character warms up early in the spring, and enables growers to get their fruit on the market from two to four weeks ahead of their nearest competitor. I have authentic records from the eastern states where strawberries are grown in almost pure sand and a record of from 12 to 15 quarts of strawberries have been taken per acre. Such soils are very lacking in plant food and the only thing to recommend them is the matter of earliness, but a soil of this character, supplemented with 40 to 75 loads of manure every year, such a method of fertilization, is keeping it up to such a point that some remarkable yields are secured.

The New Jersey experiment station had occasion to make a survey in that state to determine the relative productivity of the strawberry under different conditions. They classify the soils into heavy and light, and a survey over a very wide district showed that the average production upon the clay soils was 3223 quarts to the acre, as compared with 2359 quarts from the sandy soils, giving a net gain of 864 quarts to the acre in favor of the clay soils. Hood River not only varies as far as the altitude is concerned but it also varies with reference to soils. In the lower valley close to town, at an altitude of 300 feet, we have fine sandy loam. These soils are not rich in plant food, but they have an element of earliness and this fact, coupled with the further fact of the lower altitude enables the grower in that section to market his berries two to three weeks earlier than from the higher altitude.

Then at an altitude of 500 to 700 feet, we have a silt loam, and some clay loams, and here you have a soil which has a great deal of ntural fertility but it has the disadvantage of being at a higher altitude and the berries do not come on the market at such an early date. But that fact is somewhat overcome by the fact that the soils of that character give a higher yield than those of the lower altitude on a sandier soil.

In the up valleys at 1300 to 1500 feet, we have what is known as the Parkdale loam, or a red shot soil. This soil is very open and porous, it has a fairly tight subsoil, so the moisture holding capacity is fairly good. Most of this is new, and is splendidly adapted for strawberries, although the yields are not as high as in the middle valley where you have a heavier soil.

In the Hood River Valley then, we have three distinct soils, the light sandy soil in the lower valley which makes it earlier, the silt soil and the Parkdale loam which produces those berries from two to three weeks later than the remainder of the valley.

It may be laid down as a general rule, that an ideal strawberry soil is one which has a great deal of natural fertility, which has a high moisture holding capacity, and which is worked easily. It isn't always possible to combine all of those advantages in one soil. So in choosing a soil for any variety, sometimes it is necessary to give ground in one direction in order to gain in another.

An ideal strawberry section is one in which the air drainage is good. Hood River is fortunate in this last. The topography of the country is such that there is a natural air drainage and seldom a killing frost occurs during the blooming season, that cuts down yields in any marked way.

In the question of moisture, Hood River is fortunate in having an irrigation system, so we can regulate our moisture as we please. Practically the entire valley is under the ditch. During the harvesting season especially water is used in large amount. The Hood River system provides for four * * * This is equivalent to practically thirty-six irrigations during the growing season, so we have an abundance of water to supplement the rainfall that occurs at that time of year. The matter of closeness to market is one which has to be taken into consideration. Hood River is unfortunate. Our market is away off in the Dakotas, and Minnesota. We have to ship our fruit a considerable distance in order to find a remunerative market.

Origin of the Development of the Strawberry Industry in the Hood River Valley.

Hood River is primarily an apple section. The growing of the strawberry is only a small industry and is merely considered as a side line. During the development stage of the apple, it was necessary for those of limited means to have some intercrop which would give them immediate cash returns, and the strawberry appeared to be the logical choice. Not only because it would fit in well with the system of management, cultivation, etc., but especially because the strawberry was a high cash crop.

It was desired to find some variety that would be well adapted locally and which would be suitable not only for the fresh fruit trade but also for the cannery, in the selection of variety we had to take into consideration the shipping ability of the variety as well as its canning possibilities. All these considerations caused the choosing of the Clark's Seedling as the one berry best suited under Hood River Valley conditions. This variety wasn't mentioned at all this morning and I wonder if it is grown at all successfully in the Willamette Valley. I would like to point out some of the characteristic features of the Clark's Seedling, that has caused Hood River to choose it in preference to any other variety.

It is a very attractive berry, the color is very distinctive, it isn't an ordinary red but it is a rich dark red, not only on the surface but all the way to the center and this characteristic color is greatly enhanced by the presence of lemon seeds which stand out in very beautiful contrast to the dark background. I don't know of any berry that is more beautiful than the Clark's Seedling. It has a flavor which is very distinct; it isn't a sour berry and it isn't a sweet berry, but has a happy combination which may be called sub-acid. In this respect it has a flavor which is remarkable and one which finds favor in the markets which the Hood River Growers have developed.

Another point in its favor is the fact that it is a very good shipper. The fact that the seeds are raised in this variety acts as a sort of pad so abrasions do not take place in shipping. Another point is it has stems which are not too coarse and which enables the grower to pick it readily.

Then again, the matter of shape. It is roundish ovate, and runs very uniform in shape and size, and for this reason is packed out very readily. It is remarkably free from disease. Mildew, often found on other varieties even in the Hood River Valley, is not true with the Clark Seedling. This variety is capable of long productivity. It is not at all unusual for the grower to take four or five crops under suitable conditions in the Hood River Valley.

The stems upon which the fruit is grown are erect. In other words, where we have an irrigation system, if your stems were decumbent, your fruit would lie down on the wet ground and would mold. But the fruit is held up so there is no danger from this source. These are the strong points in connection with Clark's Seedling.

The one weak feature is the fact that it is a shy bearer even under the most favorable conditions. You don't get the remarkable yields from the Clark's Seedling that you do from the Trebla or the Ettersburg, or any of the other varieties which were mentioned this morning.

Regarding the origin of this variety it is supposed to have been a seedling of the Wilson, and was originated in the early 80s by Mr. Clark. Propagation is a very simple matter and has already been touched on. The first class strawberry grower under Hood River conditions, insists upon getting his runner plants from the one-year-old stock. The plants which are set out in the spring are the ones from which he takes his plants on the following spring.

The mother plants are simply set out from fourteen to eighteen inches apart, between the plants in the row, and the rows thirty to thirty-two inches apart. Regular care is given to this patch until early in the season when no further cultivation is given. The runners are allowed to set and no further care is given them other than possibly a small amount of irrigation; then the following spring, the plants are dug early, the dirt is shaken loose, the plants are properly trimmed and bunched and put away in storage boxes ready for planting.

Preparation of the Ground and Planting

The Hood River grower realizes if he is to secure yields that will enable him to stay in the business it is necessary to build up his ground before he plants. That means the encouragement of some green crop, clover, alfalfa, vetch, that will enable him to incorporate a large amount of organic matter in the soil. Vetch or clover is preferred because the alfalfa is difficult to get rid of.

As a preliminary to his plantation, that is always considered as the best practice. The clover is plowed up in the fall and allowed to remain rough until the following spring. Then comes very thorough cultivation. This would mean a great deal of double discing and harrowing down in order that the land may be in perfect shape.

It is then leveled as nearly as possible so there will be no difficulty in irrigation later on, then is marked off. The rows are marked off 32 inches apart, and when the planting is done the plants are set from 15 to 18 inches apart; 16 inches apart would give approximately 13,000 plants to the acre.

Under our conditions the benefit is from early planting. As a rule he attempts to get his plants in not later than the first to the middle of March, if the ground is ready; early planting is preferable, because at this time of year there is a great deal of moisture in the ground, the temperature is yet at a stage where evaporation does not take place rapidly, and the plant is enabled to gain a very good start. The care given to the strawberry patch during the remainder of the year is a subject with which you are probably all familiar.

If the rainfall is scarce, irrigation may be given during the month of July and August, but with the intensive cultivation as given under Hood River conditions, there is usually enough moisture present for maximum requirements. Where excessive irrigation is given during the first year, there is a tendency to shallow rooting, and where that is true as a rule the plants do not bear as heavily as where the roots are encouraged to go deeper.

In general the care is cultivation approximately every two weeks during the entire growing season, supplemented by an abundance of hand hoeing around the plants. Everything is kept perfectly clean. When the blossoming season arrives, it is usually considered good practice to remove the blossoms so that all growth may go into the development of the plant. Very little fertilization is given to the strawberry during the first season.

The care given to the patch during the second year, is not a great deal different from that which is given during the remainder of the first growing season. As soon as the spring opens up and the ground is warm, the grower gets busy with his horse cultivator and every two weeks up to the time the blossoms appear, cultivation of this sort is given, very shallow. As was true the previous year, this is supplemented by a great deal of hand hoeing.

About the time the plants are ready to bear their crop, the rows are rilled off so irrigation may be given. As a rule, no irrigation is given to the strawberry patch previous to the development of the fruit, but thereafter, as soon as the strawberry season begins, it is not at all infrequent for the patch to be irrigated every two or three days depending upon rainfall and the evaporation taking place at that time of year.

The strawberry is a plant which requires an abundance of moisture. The yields may be greatly increased or decreased as this practice varies under our conditions in Hood River. The rule is to irrigate every alternate row, at every irrigation. Irrigate one row at one irrigation and the next row will not be irrigated at that time, then the next irrigation, the row which was not irrigated previously will be given the water. In this way the ground is not kept excessively wet, and the growers can pick without standing in moisture which would be disagreeable.

Following the strawberry season—the season lasts all the way from two to three weeks—the patch is given practically no care for at least three weeks. In this case the growers figure that giving the plants a rest is a good practice. As a rule the patch is not touched until about three weeks after the harvesting season, then the grower uses a sharp hoe, and the entire top of the plant is removed. This includes the runners, and in this way it gives the plant a new start. It stimulates production of new leaves and the formation of a new head early in the season.

In 1919 the Hood River Experiment station had occasion to conduct an experiment based upon the proper time for the topping of plants. We chose four blocks for this purpose. The first block of plants was headed back on July 16. The second on July 26th. The third on August 5th and the fourth received no heading back at all. The results are as follows:

The block which received the early topping gave the largest yield; that which received the second topping stood next, the one which received the last topping stood third, and the one which received no topping stood last in point of production. The increase in production which block number 1 with early topping, over the check block which received no topping was 30 per cent which is a substantial increase under our conditions.

The berries in the later part of the season were classified according to size. The figures show that the check block which had no topping had 42 per cent of berries that were as small or smaller than 6x6 to the hallock, whereas only 30 per cent were 6x6 from the block which was topped early in the season, so the value of topping in this case seems to have been fairly well established.

Harvesting.—To the inexperienced man this is a very beautiful sight, but to one who has been through the mill and handled all the factors during the season, it really taxes the ingenuity and patience of the grower to get the best results. The strawberry grower at Hood River insists that his berries be picked promptly and on time. We figure that the Clark Seedling should be picked before it is fully red. When the berry has become all the way from half to three-fourths red, we figure that the berry is sufficiently ripe to enable it to develop prime quality thereafter before it is ready for consumption, and when picked at that time is capable of carrying long distances.

It is often necessary for the grower to have his pickers go over the patch every two or three days during the rapid ripening season. During the early season it may not be necessary to go over it more than once every four days, when ripening takes place rapidly sometimes it is necessary to go over the patch every day in order to see that the berries are in prime condition. The grower appoints a field superintendent whose business it is to see that all the berries which are ready at the proper season are picked, and to see that all pickers keep in their proper rows. As a rule Hood River has not very many difficulties as far as securing labor is concerned. Once in a while we have a few worthy members of the I. W. W. who scatter some of their propaganda and stir up trouble, but as a rule we have all the pickers we want who are ready to serve us at going prices.

Then again, with reference to packing. Hood River has always stood for a standard pack which is very attractive. I have a circular letter from the Apple Growers Association through whose hands the berries are shipped. It represents in a very clear way just what is expected of the packer, under date of May 28, 1921.

CIRCULAR NO. 247.

Subject: Instructions for handling strawberries and picking and packing prices.

APPLE GROWERS ASSOCIATION

May 28, 1921.

To Our Strawberry Growers:

There will be no change in the grading of commercial strawberries this season, but a more careful inspection will be made this season than has been the custom for several years. Strawberries bring exceptional prices and we owe it to ourselves, our trade and the customer to deliver what we sell. Some growers face their berries nicely but are careless about those under the facing. Others grade and pack nicely but are careless in handling and hauling and the berries present anything but an attractive appearance when delivered to the warehouse. Therefore, the following should be read carefully and followed just as carefully:

The FACE or TOP of each hallock must be a fair sample of the berries underneath. Not to exceed 15 per cent may be smaller. The Federal and State authorities have laws covering this matter and any misrepresentation will be prosecuted. Heavy fines are assessed against those who fail to comply with these laws, and our inspectors instructed to watch this matter carefully so that nothing shipped by the association can be complained of.

FIVE by FIVE (5x5) is the smallest topping that will be received. POSITIVELY NO EXCEPTIONS TO THIS RULE.

BE SURE and bring your berries to the warehouse in wagons or trucks having SPRINGS and drive SLOWLY. If the berries are shaken up, the packers' efforts are lost and the berries are only fit for the cannery. Cover your berries to keep out the DUST.

DO NOT ALLOW berries to stand in the wind or sun. Get them under cover and pack as quickly as possible. Do not hold them overnight, as they do not look as good the next morning.

NO STEMLESS BERRIES, no bruised berries, and no berries less than three quarters (¾) inch in diameter will be accepted in the commercial pack.

USE CLEAN CRATES, nail them carefully, always remembering that we are catering to the highest class of trade who want the best. Fine stock in a dirty crate will not sell to advantage. Take an interest in your business. It is yours. It is what you make it. DO YOUR UTMOST to do YOUR PART and the RESULTS will be satisfactory. To be assured of securing strawberry crates it is necessary to place your order at once.

You can save money by having the Association do your hauling.

PRICES FOR PICKING AND PACKING STRAWBERRIES

The following uniform prices have been decided upon as the proper schedule for picking and packing strawberries.

Picking price for 1921. This has been fixed at 9 cents per carrier, (of 6 hallocks) with the provision that all pickers who remain with the grower through the entire season shall receive a bonus of 2 cents per carrier.

Packing price for 1921. This has been fixed at 17 cents per crate with the provision that all packers who remain with the grower through the entire season shall receive a bonus of 3 cents per crate. These prices are suggested as proper recompense for those who do satisfactory work and comply with all the rules and regulations covering the strawberry harvest.

The Association Employment office is now open in the former D. McDonald Store Building No. 308 Cascade Ave. Mrs. J. W. Ingalls is in charge of the office and you should place your orders for help at once. Phone 1422. Her phone after office hours is 2494.

Yours very truly,
APPLE GROWERS ASSOCIATION,
By A. W. Stone, General Manager.

As a rule, with rigid inspection and close cooperation by the growers the result that has been recommended there is usually arrived at. As a rule very little complaint is heard from the market regarding the condition of berries upon arrival.

The matter of the proper fertilization of these plants: In 1916 we found there was a great lack of standardization in this respect. Some of the growers were using nitrate of soda, all the way from 300 to 500 pounds to the acre. Some were using sulfate of ammonia, in equivalent amounts. Some were using the Beaver Brand formulas put out by the Union Meat Co. Some were using sheep guano, as a whole very little standardization.

We might say even though we have been experimenting with this subject for a number of years, there is still a lack of standardization and we don't feel that we have the problem solved in as satisfactory a manner as we should. In 1916 the Hood River Station conducted a number of experiments tending to show the value of various fertilizers on this crop. In this case we chose one-year-old patches that were bearing the first crop when the experiment started. In both cases the plants were set upon Parkdale loam or red shot of which I have spoken, located at an altitude of 1300 feet above sea level.

In both cases the land was new, having recently been cleared, and upon which clover had been growing for two years. A very heavy crop of clover was turned under previous to setting these plants. In both cases the berries represented a very desirable condition. They were very vigorous plants, and it was a question when the experiment started, whether or not additional fertilizer was necessary under these conditions.

Briefly our experiments were as follows:

Block No. 1 received a total application of 220 pounds of nitrate of soda, to 10,000 plants applied early in the spring.

Block No. 2 received the same amount of nitrate of soda, applied at blossoming time.

Block No. 3 received a total application of 220 pounds, one half applied early in the spring and the other half at blossoming time.

Block No. 4 received an application of 440 pounds to 10,000 plants, applied early in the spring.

Then we had another block which received a similar amount of nitrate but in two applications, the first early in spring and the remainder at blossoming time.

Five blocks, 110 pounds to 10,000 plants, or the equivalent of practically one acre, compared with the maximum application of 440 pounds but in both cases we have the total amount split up into two applications. Two tests were conducted along this line.

In addition to the blocks mentioned, the combinations of nitrate, superphosphate and sulfate of potash. In this case the nitrate of soda tested 15 per cent, superphosphate 17 per cent, phosphoric acid and potash 15 per cent when combined at this rate.

220 lbs. nitrate of soda.
470 lbs. superphosphate.
125 lbs. sulfate of potash; we had a combination testing.
4 per cent nitrate.
9 per cent phosphoric acid.
7 per cent potash.

In addition to this complete fertilizer of which I have spoken, we combined superphosphate and sulfate without nitrate; in other cases, nitrate and sulfate of potash. Another, nitrate and superphosphate. Another one sulfate of potash, and finally the 12th receiving an application of 470 lbs. of superphosphate.

The largest yields from these experiments were from the heaviest applications of nitrate of soda, a total application of 440 lbs. nitrate half applied early in the spring and the other half at blossoming time, gave an average the first year of 448 packed crates to 10,000 plants.

The following year gave 257 crates, the following year 138 crates, but the third after was 281 packed crates to 10,000 plants.

Next in order was the 440-pound application to 10,000 plants applied early in the spring, and next in order was the application of 220 pounds, half in the spring and the remainder at blossoming time.

The outstanding feature of this experiment is the fact that heavy applications of nitrogen, in this particular case nitrate of soda, gave the highest yields. The remarkable thing is despite the system of turning under heavy applications of organic manner in the form of clover, additional applications of nitrate gave greatly increased yields, so apparently under our conditions nitrogen is the limiting factor. Wherever we had combinations of nitrate of soda with superphosphate and sulfate of potash we did not secure as high yields as we did where we used the nitrate of soda alone.

Studying this fertilizer experiment we have realized that there are shortcomings that might have been overcome under different conditions. The mixed fertilizer combination of which I have spoken represented 4 per cent of nitrate, 9 per cent phosphoric acid and 7 per cent of potash. It is quite possible that other combinations of mixed fertilizer would have given results that were superior to the mixed fertilizer that we used here.

The berries which were produced on the heavily nitrated block were not as firm as was true of the berries which came from the mixed fertilizer block, and with us where quality is prime requirement it would seem that in order to play safe we would have to use some superphosphate and sulfate of potash in our combination in order to overcome any possibility of this kind.

During the first year when we had a long cool growing season, we had 49 days that year, we had no difficulty with soft berries, even though we did use a large amount of nitrate. They used it heavily the following year and the next year results were not so satisfactory. Yields increased but during a short hot ripening season the berries although larger and of larger quantity, were not up to the standard that was true during the previous year.

We conducted some other experiments that were based upon the use of a mixed fertilizer. Last year we tried (and have for two years now) combinations of nitrate, superphosphate and sulfate of potash. In one we used

220 lbs. nitrate.
300 lbs. superphosphate.
143 lbs. sulfate of potash.

half of which was applied in summer and the other half in spring.

Block No. 2 received

220 lbs. nitrate.
150 lbs. superphosphate.
143 lbs. sulfate of potash.

applied half in the spring, and half in the summer. The winning combination this last year was the one in which we put on

220 lbs. nitrate.
300 lbs. superphosphate.
72 lbs. sulfate of potash.

half of which was applied in the summer and the other half early in the spring. In this case we have a combination which represented 5½ per cent of nitrogen, 9 per cent phosphoric acid, and 4 per cent potash. In this case our percentage of nitrogen runs fairly high, sometimes they use 3 per cent, but we have 5½ per cent.

(Copied from black board the following:)
Nitrate of soda, 15-16 per cent.
Superphosphate, 17 per cent.
Sulfate of potash, 35 to 50 per cent.
Muriate of potash, 50 per cent.

220 lbs. nitrate of soda.
300 lbs. superphosphate.
72 lbs. sulfate of potash.

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Early Fertilizing Urged

Did not recommend the same applications here as at Hood River on account of irrigation conditions there.

We have learned that we have to crowd our yields, we have a very shy bearing variety. Heavy applications of nitrogen will give us that result. We don't dare to put that on alone for fear of having soft berries. It is not best to put on an excess of potash. Berries will be more or less seedy. Combinations such as above gave berries which avoided that difficulty.

Prices.—I have already indicated that the Clark Seeding is a shy bearer. As that is true you can readily see if the grower is to practice the intensive methods I have mentioned of cultivation and fertilization, he has to get a pretty good price for his berries. I went to the Apple Growers Association the other day and they furnished me with the pool price they have paid net to the growers during the past three years. Total number of crates in the 1919 crop, four pools, 63,000 crates of 75 per cent of the crop of the Hood River Valley; 1920, 55,000 crates, and 1921, 79,000 crates. In 1919, Pool No. 1, May 20-23, representing a very small percentage of the crop averaged $4.46 for 16-pound crate. Second pool, May 24-27, representing less than 1 per cent of the crop, averaged $4.12. Third pool, May 28 to June 15, representing 56 per cent of the crop, brought an average of $3.94. The last pool, June 16 to July 3 representing 40 per cent of the crop, averaged $3.57. Consistently from the beginning of the season to the last of the season, each succeeding pool brings a lesser price per crate.

I have already brought out that the heavier soils up there, well drained, give higher yields than some of the wetter soils, but that the heavier soils are located in a higher altitude and come later in the season. So the grower has to baalnce up these to decide whether or not a higher yield at a later season would more than counterbalance a lesser yield and earlier in the season.

The figures favor the man with the high yields.

1920—

1st pool, May 24-June 7, $5.08.
2d pool, June 8-15, $5.06, 27 per cent of the crop.
3d pool, June 16-27, $4.05, 57 per cent.
4th pool, $4.50, 8 per cent of the crop.
5th pool, $4.50.

There was such a demand for strawberries during 1920 that the pool prices all the way from June 15 to July 4 and even up to the first of August remained stationary.

1921—

Strawberries brought a very good price the year of depression when practically all other farm products sold at a very reduced price.

1st pool, May 18-31, $4.78.
2d pool, June 1-3, $3.89.
3d pool, June 8, one day, $3.58.
4th pool, June 9-28, $2.76.
5th pool, $2.63.
6th pool, $2.41.

Taking the season as a whole, considering the financial conditions, we feel that the prices which have been paid during this past year and especially favorable to the grower and anyone with careful husbandry is capable of producing yields that will enable him to make a fairly good profit.

Production table for the Hood River Valley.

1914, 84,000 crates.
1915, 87,000 crates.
1916, 85,000 crates.
1917, 45,000 crates.
1918, 53,000 crates.
1919, 63,000 crates.
1920, 55,000 crates.
1921, 79,000 crates.

The ripening season in 1915 and 1916, the years when we had 87,000 and 85,000 crates, were 49 days and 38 days respectively between the first and the last carloads of fruit shipped. The next two years we had an entirely different season. The season was late, it warmed up very rapidly and the berries came on so fast that they had to be handled very promptly.

Those two years the season was only 23 and 25 days, only about fifty per cent or half as long as for the two previous years. Those short seasons pulled down the yields very materially.

(Read statistics from the following, closing with conclusions.)

Economics of M. Yasui Place, Summit

Representing Maximum Returns Under Most Favorable Conditions

Soil.—Medium clay loam between valley soil and hill land.

Altitude.—600 feet—Exposure, contour, drainage.

Cleared in 1916 of pine and oak.

Soil Preparation.—Clover in 1916, planted spring 1917.

Variety.—Clark seedling, 11,500 plants to acre.

Season.—Midseason. Yields packed crates (variety a shy bearer.)

Year.	Crates.	Ave. Per Acre.	Price Per Crate.	No. Field Pick Per Acre.	Value.	Gross Value.
1918	1,872	178	Net			
1919	2,486	237				
1920	2,530	241	4.72	240 @14c	33.60	$1171.12
1921	2,614	307 (8½ acres)	2.96	2.23 @3¼c	7.2c	915.96
1922	?	Patch still vigorous.				

Costs of Production

Harvesting Cost—	1920	1921
Picking per crate (4 heaped carriers)	.62	.44
Packing per crate	.265	.20
Cartage (packed crates)	.06	.05
Crates	.35	.27
Irrigation at harvest time	.05	.05
Packing home help	.05	.04
Total harvesting expense	1.39½	1.05

Production Costs—

Labor, cultivation, hoeing, irrigation, topping.

1920—10½ acres @ $1170.00	.462	
1921—8½ acres @ $ 971.40	.371	

Fertilizers—

1920—3 tons @85—$255.00 (Dwell on)		.10	
1921—3 tons @80—$240.00			.091

Incidentals, (tents, hand pickers)

1920—	$250.00	.099	
1921—	$150.00		.057

Taxes, State and County.

1920—	$ 47.00	.018	
1921—	$ 51.00		.011

Irrigation—(Maintenance)			1920	1921
1920—	$ 50.00	.019		
1921—	$ 30.00			.011
Totals			.698	.540
Grand total per crate			2.093	1.590
Net profit per crate			.63	1.37
Net profit per acre			633.00	420.00

(All expenses not included—First cost not included)

Statement of M. Yasui Place, Dee, Oregon.

Soil.—Red shot Parkdale loam, new land.

Preparation.—Clover.

Acres—20. Altitude, 1300 feet.

Cost of getting started.—$4700—1919. This to be written off—a first class patch of berries, no weevil.

Returns.—1920—Broke even—no profit—nothing written off.

1921—3150 crates—gross return of $7947.36.

Net returns, $2191.89.

Total applied on first cost,	$4700.00
	2191.89
	$2508.11

Routine—labor	$1490.16
Harvesting—labor	303.50
Pick and pack	2105.30
Incidentals	19.20
Hired horses (cult)	42.00
$2.00 per day	
Cartage to Dec.	157.50
Fertilizer 4½ tons	360.00
Cartage empty to Dec.	36.36
Rental	500.00
	$4914.02

Last extreme frost—root weevil.

Pool Price Paid Strawberry Growers by Apple Growers Association of Hood River—Variety, Clark Seedling.

Pools closed early that year.

Total crates handled by Association 1919.

	1919 Crop—	Crates.	Per Cent Handled.	Price.
1.	May 20-May 23	137	.21	$4.46
2.	May 24-27	615	.97	4.12
3.	May 28	35,663	56.4	3.94
	June 15			
4.	June 16	26,750	40.7	3.57
	June 3.			
	Total	63,165	98.28	

1920 Crop—
Total crates handled by association, 1920.

1.	May 24.			
	June 7	2,802	5.08	5.93
2.	June 9-15	15,143	27.4	5.06
3.	June 16-27	31,729	57.5	4.05
4.	June 28	4,472	8.1	4.50
	July 3.			
5.	July 4-Aug. 1	960	1.7	4.50
	Total	55,106	99.78	

1921 Crop—Year when farm products as a rule sell low—
Total crates handled by Association, 1921.

1.	May 18-31	267	34.7	$4.78
2.	June 1-3	1,125	1.4	3.89
3.	July 8	9,628	12.08	3.58
4.	June 9-28	65,905	82.7	2.76
5.	June 29		2.6	
	July 8	2,116		2.63
6.	July 9		.78	
	August 2	615	2.41	
	Total	79,666	99.90	

WHAT COOPERATION HAS DONE FOR THE SEBASTOPOL BERRY GROWERS

By Frank B. Bill, Manager Sebastopol Berry Growers Association, California

Before saying anything at all relating to the subject assigned to me I want to express my pleasure at being here today. I assure you that it is a real treat for me. And if I can, in giving you a short history of my association, the Sebastopol Berry Growers, bring to you any information that will assist you in solving any of your own problems I shall be doubly pleased. And if I can, as I expect to do, learn something from this convention, I shall be both pleased and satisfied.

I had the pleasure of visiting your Salem district here last May and through the kindness of your general manager, Mr. Paulus, I was able to see a considerable portion of the district. I also visited with Mr. Paulhamus at Puyallup, and with Mr. King and Brady of the Washington Berry Growers so I have some idea of your conditions here and of the problems facing you. They do not differ much from our own. We have a market for fresh berries which you do not have.

But in regard to the handling of our surplus berries, the canning grade, we are up against much the same situation as you are. And to be frank with you, although you seem to regard the Sebastopol Berry Growers Association as a howling success, we are not much nearer a solution of this problem than you are. We are, as I understand it, better organized otherwise, the situation is much the same. As I tell my story you will see how this is true.

In regard to our success. It consists principally in this that we have been able to gain and retain the confidence of growers mainly through getting them better prices for their berries than they could otherwise get. We have also builded up a good shipping trade which has proven very profitable. We have started and successfully conducted a retail hay, grain and feed business, which has proven a valuable adjunct to our co-operative efforts, but we have much to do yet before we can be said to have made a success.

I bring you a message of good will from the directors and members of the Sebastopol Berry Growers Association. We do not regard you Oregon and Washington Growers as competitors, in the sense in which that word is applied to business generally. It is true as matters stand now that we are competing with you to a certain extent, but we are looking forward to the day when this small amount of competition can be removed.

This is no serious problem of production, nor am I ready to believe that there is yet a problem of over production. There is market for all we produce but co-operation organization alone can develop it. Your problem and our problem is to find a profitable market for that which we produce. We in California have learned that the grower must not only produce the best quality of commodity possible, but he must also through proper co-operation and organization find and develop a market also. Dependence must not, can not be placed on those dealers, brokers and canners too, if you please, whose sole interest in the business is prompted by the profit they themselves derive from its conduct.

The form of our organization is somewhat different from the usual association. We are a joint stock company; 5000 shares, par value $10.00 each; 1680 shares are subscribed and paid up. No grower may hold more than 50 shares and ownership of stock is confined to active growers as closely as possible. Each share has one vote as provided by law. We have seven directors elected, four and three on alternate years.

You will understand that our whole district is in one section about 20 miles long by 10 miles wide. A county of rolling hills and with much clayey soil resembling in many ways your Salem district here. Our part of Sonoma County is known as the Gold Ridge section. The Gravenstein apple is our best money maker and the principal reason we are in the berry business is that berries, offering as they do quick returns were the best crop to interplant with, so that an income might be had while the trees were coming into maturity. We have still many acres of undeveloped land so that we will be in the berry business for some time yet.

In addition to handling berries as a co-operative Association our joint stock company of grower stockholders engaged at the start of our organization in a retail hay, grain, feed, box shook, spray material and fertilizer business. This enables us to keep a year 'round organization. It also carries part of our overhead expense and because of it we have been able to handle our berries on a smaller handling charge than would have been possible without it. This business has more than paid its way and in addition to paying 6 per cent dividends on our paid up stock we have accumulated an earned surplus of $31,000.00. About $12,000.00 of this surplus however, is due to a fortunate venture which we made in buying berries from some of our independent growers. I will tell you about this presently.

I see by the program that I am to tell you what the Sebastopol Berry Growers have done for the berry growers of California. Now California is a big state and as I have said our activities cover only a small portion. However, I believe I am correct in saying that three quarters of the bush berries produced in the state are grown in our section. We do not handle any strawberries. Only enough strawberries are grown in our section to supply the home demand. We did try to handle strawberries but after one year, finding that we could get no sort of control of the market which was entirely local we gave it up. I can speak therefore for our efforts in behalf of the growers of our section.

We have made our growers thousands of dollars. Yes, hundreds of thousands of dollars in the 13 seasons we have been operating. We have developed a market for approximately one third of our production which without co-operation would never have been developed. And it has always been a profitable market. I refer to our Middle West shipping trade. In normal seasons we ship about 125 carloads of 600 24-pint double deck crates of about 750 tons of which one third to one half are Loganberries. This business has paid from twenty to eighty dollars more per ton each year than has our cannery grade. We have markets for three times as many Loganberries as we are now shipping and we are urging our growers to plant Loganberries to take care of this trade.

During the last two weeks I have spent considerable time with a gentleman from Omaha who has been acting as our broker, there, trying to find a large tract of land suitable for Loganberries which could be leased. He has been selling our berries and hasn't been getting enough of them. Thinks he can see big profits in the growing end. I mention this to illustrate the character of the business which we as an association have built up. We are going to get Loganberries enough planted in our district to take care of this trade.

In normal seasons we can ship 90 per cent of our Loganberries, but we have had seasons when weather conditions interferred to such an extent that 50 to 60 per cent of our Logans were forced into the cannery. In 1916 when the demand for Logans was not equal to the supply we put in a Loganberry juice plant and leased it to a San Francisco firm. They crushed 150 tons of Logans that year but did not make a success of selling the juice and as the market for the berries improved and our production fell off somewhat we did not operate the plant again. For the berries crushed that season we received $50.00 per ton as compared to $38.00 for canning grade.

I have said that our association has made hundreds of thousands of dollars for our growers in the 13 years we have been operating. Let me give you some figures to prove this statement. In 1917 there was still a considerable tonnage of berries outside of the association. We urged these growers to join the association that year as we had been doing every year, but without much success. The majority of them wanted to sell their own crop and wanted to know what they were going to get for it. We were then handling our cannery berries under a cooperative contract with the C. P. C. as we are now in fact. Under this contract we never knew until most of the canned goods were sold what we were going to net our growers. I will explain this contract to you later.

These growers wanted to know what they were going to get. The independent canners were offering $50.00 for blackberries and $55.00 for Loganberries, and were gradually buying up these outside berries. The C. P. C. could not buy without our permission so we made them a proposition that they go out and buy as many of these berries as they could get at offering prices and that we would share profits or losses with them. They succeeded in buying in 500 tons at $50.00 and $55.00 per ton.

In 1918 after the canned goods were sold out we received a check for $18,047.69, as our share of the profits; $12,000.00 of this amount went to our surplus account, the balance went to Uncle Sam to help pay for the war and the Democratic Administration. Our own growers delivered to us that season 2200 tons of berries. Had there been no association the offering prices would in all probability been lower than the $50 and $55.00 per ton but using those prices for a comparison and our profit on the 500 tons as a basis for figuring our growers received because of the Association that year, $79,200.00 more for their crops.

Here's another example. One of our growers who had a crop of 50 tons of Loganberries in 1919 decided that he could make a better sale than the Association so he withdrew his contract with us and sold his entire crop of 50 tons at $135.00 per ton. Had he remained in the Association he would have received $278.00 per ton. He consequently received $143.00 per ton less or the neat sum of $7150.00 less than he would have been paid had he remained loyal.

These examples prove conclusively that cooperation pays and that the Sebastopol Berry Growers Association has justified its existence and that it has done something for the berry growers of the Gold Ridge Section. What our Association has done, your Association can do.

Your problem is bigger than ours. You have many times more berries and you do not have the shipping outlet. However, I believe that the fact of our shipping so many Loganberries fresh will serve to create a demand for the canned berry, the evaporated berry and for Loganberry juice. It is up to your growers to organize and help create this demand by judicious advertising and by putting out your products manufactured by yourselves and under your own brands, fill the demand with profit to yourselves.

National advertising campaigns, universal grades and brands, to say nothing of distribution of highly perishable products, as well as those rendered less perishable but none the less seasonal, by proper preservation can not and will not be developed or carried on by private firms. It is true that certain of our larger packers have done and are doing some very good advertising of our products, but their efforts do not have the "pep" and push behind them that the growers own campaign would have. Neither does it have the appeal to the ultimate consumer that the growers own efforts have.

The ultimate goal of our California Growers Association is the placing into the hands of the dealers our products properly graded, packed and branded in our own plants, and under our own supervision. It is in fact to place our products, be they manufactured articles, backed up by national advertising. Part of this program is now being realized by several of our larger associations.

My own organization has much to do before we reach this goal but we are surely working toward it. This goal we know can only be reached by the thorough organization of the producers. The producers must organize and stay organized through thick and thin. Your own Association, your Mistland and other brands, the general plan and conduct of your organization points out the same goal. Your Oregon growers must organize as we are organized otherwise you will jeopardize our success. We may be selfish in our interest in you, but selfish or not we want to help you.

Other and much more able speakers than myself will bring you this message of the necessity of organization, but I can not refrain from adding my word to theirs for the good it might do.

The Sebastopol Berry Growers Association organized about 13 years ago have achieved some measure of success. Beginning with only a small percentage of the berries of the Sebastopol section under contract and with only a small membership, about 50 growers out of about 250 we have gradually gained through the years until we now control about 90 per cent of the tonnage and our membership numbers 475 of whom about 400 are active growers. The total tonnage of berries handled in 1920 was approximately 3000 tons, 400 tons being Logans and the remainder blackberries.

The crop in 1921 was about 2500 tons and 200 being Loganberries. Our Loganberry production has fallen off considerably principally due to some trouble we have had with what we call Loganberry rosette for want of a better name. It seems to be caused by a sort of running out of the stock caused no doubt by careless selection of plants. I do not know whether you have this trouble in Oregon or not. You should be careful in selecting only good healthy tips from strong vigorous vines. Our trouble has been largely overcome in this way and we have a considerable new acreage of Loganberries coming on. Our 1922 crop should be about 800 tons.

GROWING RED RASPBERRIES IN THE GRESHAM DISTRICT

By D. E. Towle, Manager Cooperative Berry Growers Association, Gresham, Oregon

I will say this, that as a preface, that if we could find the right location and the right soil and the right thing to grow we would succeed. They tell us that the question was asked Mr. Paulhamus of how many berries can a man grow to the acre. He came back "Show me the man." There is a lot in that. You can't hope to succeed unless you find the right conditions.

The red raspberries that I know of principally are the St. Regis, the Everbearing, that the gentlemen from California spoke of yesterday—

if you were here. The berry is evidently adapted for their country, but we would not use it here at all. It isn't a very good berry fresh or heavy producer.

We have the Marlborough which is a berry that is early and a good yielding berry, but not of very high quality. If you are interested in supplying town demand it might be well to have some, but do not take it to a cannery—they don't want them in canneries. Wo sold them last year to Libby, McNeil & Libby, and our friend, George Gibson, who represents the Company, says "Never More!" Outside of this they are a fair shipper.

Well, let's see, we only have one variety left—the famous Cuthbert. With us it is giving very good satisfaction and we are well satisfied with the results. It grows berries whether it rains or not. It might be a little different here but there is a great variety of soil conditions, and as Mr. Brown says, it is vital that we have drainage.

Here's a thought for you! This red raspberry is a monopolist and within one season will set out eight foot feelers covering a whole lot of ground if not controlled. We have outside support and it is a good thing.

Speaking of the mole, we say he is a good fellow because he lives on insect life and raspberry roots. Think he is a help in raspberries—don't pay any attention to him. He eats outside stalks.

As to the cultivation—eight feet apart for rows is all right. Some are setting three feet apart now. The tendency all down the line and everywhere I guess, was to plant too close together. Old orchards were planted too close. We planted up to two years ago thirty inches—three feet apart now. I have in that one advantage in that it is the first two years you have to use the hoe and cultivate cross wise, and sometimes the wire isn't so very material the first year, but you will find that it is a great advantage.

We are discovering new thoughts as we go along in our industry down there. We find we are growing berries too large. We also find that the greatest demand is for the highest quality. We can't get that highest quality out of the largest berries. Why? The largest berry has a big cavity and breaks down quicker.

We tried improving this in our pruning. If you can hold your soil moisture. Our plan is to leave more canes, fertilize and cultivate and put the crop through. We feel that we can do this because we can hold the moisture and that is very important. As a result we are going to get more berries of a uniform size and get that fancy grade that means more to the producer. It should bring a premium. If selling to cannery don't make so much difference to you in the price. The difference today between what we call the fancy case and the standard case is $1.00 gross. Twenty-two pounds of berries in case—you can figure for yourselves, so there is a premium offered all the time on quality. We hope to get out a better quality.

We, in our cooperative organization having about one hundred fifty members, passed a resolution the other day that we are going to grade the berries the next year. Will provide a man to do this—I don't expect to do it—and it may take a man with a shot gun—but we want to improve the quality all along the line because it means dollars to us.

On the fertilizing question, we will start at the beginning, if you will. If you are going to plant red raspberries, of course you will plant the Cuthbert, and should plant them north and south. This is greatly to the pickers' advantage because it enables them to pick on the shady side of the row in the morning and finish the other side in the afternoon. It also permits the berries to ripen more evenly, preventing series burning which is liable to occur on the south side of the row when the berries are planted east and west.

As to methods of wiring—disagree on that. Most popular method in small way is to weave canes in and out on wire. If I were an artist I would draw you a picture here but I'm not, but will try and show you.

After the harvesting season is over if you desire to pick out the old fruit wood—take it away—it is light on the outside.

I do not think it is wise to do fall pruning because down in our country the canes are going to make more fall growth—need small growth taken out later.

In the fertilizing question we stress the vetch growing. Now to be successful in that, the first thing to do is to cultivate and do it well, cultivate during the harvest and picking season. If you retain your moisture content you can sow your vetch seed in August if you want to.

We can plow ground when we want to, having root systems established, and more or less fibers, and vetch has a peculiar effect on soil—loosening it up. May be humus. It is cheap. Growing berries in a commercial way you can't get straw to put on them. Vetch is economical because it grows while you sleep. Seems to help soil. It is succulent and decays rapidly. Does not dry out soil and in two weeks time seems to be decayed.

Mr. Brown recommended fertilizers to you. We came here to give you all we know—it isn't very much. Our doctor down there says "Don't buy fertilizer without knowing what you are getting and knowing how to put it on."

There are these three articles, super-phosphate, potash and nitrate of soda. We have a man with us down there that I think helped us during the last few years. He has some good common sense ideas. He says for you to determine about what you want to do in the way of fertilizer, and do it annually in a certain amount.

Now when I saw these figures they were all Greek to me—2-10-2. Did not know what they were. Looked wise but did not have knowledge. That is the proposition that has been suggested to us. What is the purpose of the three elements? The next question is what does each of these three elements analyze as being plant food?

2— 10— 2
100
100 500 150

Five hundred pounds would contain 100 pounds available potash, seemed to me this runs heavy because it showed 47 per cent.

If you want to fertilize intelligently, you must see what the analyses on the fertilizer is and can then conclude how many pounds you need to give you that proportion.

They tell us in a rough way that this is a wood growth stimulant or help. Potash element is to give you firmer fruit principally.

Mr. Brown made a splendid talk yesterday, the man whom we know as Loganberry Brown, and he said he really realized that he did not do the right thing by you and left you in doubt. If your new berries have a heavy cane growth you might conclude that you did not need much nitrate. If your fruit crop was short and if the berries were large you need potash. Things are out of balance—see?

Fertilize your plants to grow first fruit crop and for fruit wood next year .

Q. Do you top off canes any or leave full length of cane?

A. In my opinion in a larger commercial way I do not think you could afford to fuss with weaving canes in. You could make wages at something else instead of weaving canes. Afflicted with picking berries longer.

Another thought suggested this year and every year with us, unless we keep up our soil moisture the canes mature and they go on and put on fruit out of season. You can avoid that by a continuous cultivation and hold moisture up and let them grow canes.

Q. I do not understand weaving system.

A. You use two lateral wires reasonable distance up, probably three and one-half or four feet—adjust size for that. Divide canes and weave them in; kind of roll them on the wire on that side and this side, and have a space between by putting in a spreader six inches long. Leave whole space open in the center and berries hang out and when young canes come up they are protected. Convenient but would not want to fuss with it in a larger commercial way. Prefer cutting out imperfect ones—give better quality if you have to guard against berries too large, but we are going to try and produce a medium size berry.

Q. Does fruit setting on in fall do canes any harm?

A. No, I do not think it does, but if you want more cane growth keep canes growing. Berries are of no value anyway.

Q. Any trouble with winter injury when you keep canes growing so late?

A. I do not know that we did, unless we have an extremely early frost. We had one last year—a frost—that affected the young berries killing the buds some. They all came back nicely though.

Q. How often do you pick?

A. Why we would like to pick every second day and to get the best results we should, for if it goes longer than that we would have more ripe berries.

We are making some discoveries down there. We are discovering this, that if we had barreled all of our berries this year we would have had as many berries and would not have had the fussing. We were educated all last summer that there is no value in berries—we almost believed it. Still I do not—I know I do not believe there is more than a thousand or twelve hundred tons of Cuthbert raspberries grown on the Pacific Coast. I figured out and found that with our population of one hundred and ten million, we would have fifty-five people to eat one pound a year. In that case there would not be a surplus of that berry do you think? There may be, but over-production is another name for under-consumption. There are folks—millions of them—in the United States that may have never heard of this berry—never have tasted it and I know ninety per cent of these same folks would like it. It is a good berry. It has that particular bouquet they call it. Down in Portland they try to associate it with the rose. Wonderful boys when they want to give publicity to their rose.

I told my friend Minton the other day that we should apply to Henry Ford to get him to adjust that Lizzie so it would burn raspberry juice.

RAISING GOOSEBERRIES IN THE WILLAMETTE VALLEY

By Harry White

I have raised my own plants from cuttings and probably year in and year out you will get on an average about 50 per cent of a stand. Some years perhaps it will run as high as 90 per cent other years perhaps not over 24 per cent depending on season and the time you get them in the ground, and the condition of the cuttings. I generally select cuttings that are at least 3-16th of an inch in diameter and seven or eight inches long. They are very easy to propagate. I just stick them in the ground, about eight inches apart, give them thorough cultivation during the growing season, early in the season is very important. If they do not have care shortly after they are set out, and keep the ground from drying out, they are liable to get stunted at the start.

Sometimes if they are grown on damp soil, especially on beaver dam, they are quite susceptible to mildew. It is necessary to give them two or three applications of 1-40 lime sulfur. Anyone who has fairly rich ground can grow their own cuttings. In doing this I don't know of any crop that you can set out that will bring as quick returns outside of strawberries, as gooseberries. They do not require any posts and wire and the initial investment is not high.

In planting on our soil near Chemawa, where it is rich we plant them at least six by six feet so they can be cultivated both ways. In the hill soils where it is a little lighter, five by five is a better distance to plant, or perhaps five by six. While we do not get any heavier yields on our soil, we do get much more wood growth. I know of soils in the hills, I doubt would produce over ten bushels of wheat that will beat our soil for producing gooseberries and we have produced 40 bushels of wheat to the acre. There is something about the hill soil, particularly adapted to producing gooseberries. I don't know of any level bottom soil that produces gooseberries as abundantly as they do in some of the poorer hill soils.

Use especial care in getting your plants out early. They are one of the earliest to bud out in the spring. I think the fall is the best time to plant. In cultivating I think it is very very important that it should be done early. My practice was to plow the soil first in February if possible and let it lay that way for perhaps six weeks then turn it out into the middle of the row, leaving a dead furrow next to the hills then hoeing out along the hills, then cross cultivating which would knock out the remaining ditch, then work the soil back during the summer. If only one plowing is made in our soil it is a pretty hard proposition to hoe that sod out from around the hill. Where a furrow is plowed to the hill it smothers out the sod, lays that way for six weeks then when thrown it will crumble down and can be hoed back easily and quickly. It is quite important during the early growing season to be sure that all weeds and grass are hoed out from around the hill. Any vegetation that you have around the plant will help the development of mildew, you want as good air circulation as you can get around your plant.

One thing that is quite important, if you delay your plowing too late in the spring, you will have trouble in stripping off the small berries. They will be stripped off by the single-tree and by the plow. On account of the gooseberry maturing early, I consder it very important that the first two plowings be done as nearly on time as possible and followed immediately with springtooth cross cultivating the rows and getting the soil worked down and conserving the moisture. There is one very important thing in plowing, it seems to me perhaps one of the most important things, that is not to plow too deep next to the hills, because the gooseberry roots are very close to the top of the soil, especially close to the hill. This is also true of the Loganberry. Where a man is plowing and is a little careless in plowing deep next to the plant, sometimes there would be half the roots cut off. That is something I think you should be very careful about, not work your soil too deep and not plowing too close to the hill.

I have fund that liberal applications of barnyard manure helps very much in your crop production as well as in the foliage. It is very important that you have plenty of foliage. This will protect the berries from frost as well as from sunburn. As a rule we never have any trouble with frost during the blossoming period but sometimes when the berries are half grown, we have hundreds of pounds of them lying on the ground injured by frost. Where the foliage is scant, and they are out on the branches of the bush they are more or less exposed to both frost and sun, and where not harvested early in the season, if left on late after the days become very hot, you will have considerable sunburn, especially in some protected locations.

I have used nitrate of soda, 100 pounds to the acre, and I am sure that it has been worth many times the investment. Perhaps the best results I have gotten in the way of fertilizers, was from hen manure. Perhaps a higher content of potash seemed to cause a heavier set of berries than any other fertilizer I have ever used.

One very important thing in handling gooseberries is in pruning. The old wood should be cut out regularly from the very start. It is important both from the standpoint of getting your wood to bearing good sized fruit, and in keeping the bush properly shaped. When the bush is first set out you will have lots of small branches close to the ground and it is hard to get the berries picked around close to the base of a plant. It has been my practice to cut off all the small branches and try to force a more upright growth. Of course after the plants get larger they bear heavily if properly pruned; in order to remove the old wood I made a practice as near as I possibly could of cutting out all the old wood, never allowing it to remain on the bush more than four years. By doing that you will keep your wood renewed so that you should grow good sized berries. You will find this the case, you will have small berries on wood over four years old as a rule.

If you allow your cultivation to get behind and you have a heavy crop, especially where the vines are heavily loaded, they will be lying on the ground and you will harvest the berries with ground in a very unsuitable condition. You may not need the moisture, but it will be pretty hard to get around and harvest the crop with the clods unbroken.

In pruning I think it important that the grower do his own, or have some one who is very reliable to do the work. I would never allow a nurseryman to take any cuttings out. You will have nurserymen who will always want to do this work for the cuttings. It would be my practice to do my own pruning and let him take the cuttings from the brush, because the wood that the nurseryman wants is the wood you want left on the bush.

We have had some trouble with the currant worm. It isn't very hard to control but if you are not on the job sometimes it will defoliate your whole patch in a week. One year I was sick and when I got up I looked at the gooseberry patch and there wasn't any foliage on it. I looked it over and it looked like there were two or three hundred currant worms on every bush. They cleaned it up in dandy shape. That about knocked the crop for the next year. For some reason gooseberries will not produce the next year if they are defoliated during the summer.

Regarding the gooseberry maggot. This has never given me any trouble, largely due to the fact I pick my crop early as possible. Where the crop is left late, worms will develop. The picking should be done clean, so you reduce the worms to the minimum. Every berry left on the bush will be a harbor for worms to carry over to another year.

The thing that gave me the most trouble is gooseberry anthracnose. Perhaps one of the hardest things to control. If it ever does get a start you will lose your leaves regardless of what you do to prevent it. So it is a matter of early spraying. Probably the most important spray of the season would be a 6-6-50 application of Bordeaux, shortly after the buds begin to swell. Then perhaps an application of 4-4-50 just before the blooming period, and one immediately after. I have found with these applications, and perhaps then one immediately after picking, will give you fairly good control. While in places where the patch is in bad shape especially if it is not growing vigorously it is hard to control and where you are not getting a very luxuriant growth. I found in spraying with the Bordeaux it never was necessary for me to use any other means to control the mildew. It isnt' always necessary to spray for mildew, even if you do not have to spray for anthracnose. If I saw mildew developing I would rig up the spray immediately. As a rule one application of lime sulfur 1-40 will control it. It has been my practice wherever I saw it developing to put on one application about the middle of the season when the berries were about half grown and I would not have any more trouble. If you are going to attempt to control anthracnose, as you should, you will not have any trouble with mildew if you are using the Bordeaux mixture.

In harvesting the crop there are two or three methods. We have in our own patch, used burlap blankets about 6 to 8 feet square, slit up to about the center, then spread around on the ground underneath the bush, the pickers use leather gloves, strip the berries off on these blankets. It is impossible to get the berries off without the leaves, although we try to have this done as much as possible, because it weakens the plant.

In cleaning we use a fanning mill, operated by a gas engine. The ideal way in cleaning is to have a fanning mill operated by a gas engine, with an elevated sacking attachment so you do not have to handle the berries after you get them clean. Where they run into a box and are then emptied into a sack, it causes more or less confusion for the reason that in weighing up the berries for the pickers, this is usually done after the fanning is done, and it is quite a job if you do it in boxes from the mill. But if you can run them into a sack direct, it is very easy to weigh them.

I would caution the gooseberry grower to be careful about plowing especially close to the plant, not plow too deep. To get your cultivation done as early as possible, get your ground in good condition, and watch your vines for anthracnose. When it first appears on your vines you will notice a yellowing of the leaves, and upon examining the leaf you will notice a small brown spot, or several of them on the leaf. This is what causes the damage. If any of you men have gooseberry anthracnose developing it is very important that you begin to control it early in the spring, if it gets a good start in your patch it will be a pretty hard proposition to control it.

VARIETY AND QUALITY OF BERRIES—THE CANNERYMEN DESIRE

By J. O. Holt

The Northwest has become the berry patch of the United States, and the Willamette Valley or Salem, seems to be the center of that berry patch. You have a chance for a wonderful development. A year ago I had a chance to see it all, as I travelled this country from one end to the other a number of times, and I don't know where one would find a larger body of land beginning just out of Salem, running north as far as Forest Grove, or further, and sloping to the east, taking in Gresham. It is fit for all kinds of berries. We have a good berry country around Eugene but it is limited as regards red raspberries.

To make a talk on canning to an audience of berry growers is a little hard. If you were cannerymen I would know how to start in. The canning game is technical so about the only thing I can do and put in my time to advantage I presume is to talk about the kind of berries that we want for canning. The day is especially devoted to the red raspberry. It won't take me very long to tell you all I know about it from the canning standpoint. We want nothing but the Cuthbert red raspberry for canning. It has a habit of growing singly and sometimes don't produce as much as the others. I like to grow black caps because I can pick them by the handful. Professor Brown referred to black caps and referred to the purple caps. I would like to know if you have any of the purple, are they good for anything? We have some out there that used to bear very well (Shafer and Columbian) they were on strong clay soils, don't go into them strongly on a canning proposition. They do grow wonderfully well and on clay soil might be a better bearer.

As to black caps I think the varieties named are good for canning purposes with the exception of the Gregg. The Gregg crumbles under various conditions and makes a poor looking product. The Kansas, the Plum Farmer, which in my opinion is a Kansas, is a good berry, and the first year or two I found the Cumberland an excellent berry but they became small and has no bloom on it. It makes a beautiful berry. The Munger is all right from the canning standpoint. We only raise a few red raspberries in our country. In 1910 we had only 7000 pounds. In ten years they have increased to 108,000 pounds. I presume they have increased in other sections of the country about the same proportion. In the ten years our price has increased from 4 cents to this season of 8½ cents, that is the cannery price.

Our Logans have increased in ten years from 15 tons to 340, and the price in 1911 was 3 cents and this year it was 5 cents. The Evergreen blackberry has had a constant growth with us. We began canning in 1911, paid 2½ cents, this last year we canned 614 tons, one and a quarter million pounds, and paid 5½ cents.

It is interesting to see how they grow. They began at 48,000 pounds and excepting 1920, there hasn't been a year when they did not increase. That was the year of the heavy freeze when our berries dropped back a little ways in the Willamette Valley. The number of berries going into barrels is increasing, and would increase more rapidly if people knew more about how to handle them and had the facilities to do so. Berries to be put in barrels, should be put in the same day they are brought in and put right into the freezer. As we go on, we are using less sugar and putting more barrels into storage, without anything at all in them. Simply putting the berries in, filling them within four or five inches of the head, heading them up and freezing immediately. This is one of the cheapest ways of handling them.

Q. What prices do barreled berries bring?

A. They are ordinarily ruled by the price of canned berries. This year we sold our barreled black berries at 8 cents a pound.

Q. I mean what price to the grower?

A. We figured our berries cost us about 5 cents delivered. We get them as far as a hundred miles away. They come in on the railroad. The one and a quarter million pounds we handled last year, were all wild blackberries from the hills.

The strawberry is a very small item with us. Because at the times we handled them a few years ago, we got nothing out of them, and our growers went out of business. Until two years ago, strawberries were almost an unknown quantity outside of a few sections. They are coming back and next year we will have a tremendous crop and southern Washington is coming back. Salem has always had strawberries. For some reason you could raise strawberries cheaper than we could. We can't get the yields.

Gooseberries, we paid 7½ cents a pound for this year, and I have heard men say they could raise them for 3 cents and make money. You have a wonderful country up here for the gooseberry.

I am not a strawberry canner. I have always told our growers there was no berry to can except the Clark Seedling, or the Wilson. But I understand you have an Ettersburg that cans well. You have canned it and I haven't. The only ones we put up were the ones we froze for our ice cream trade.

Q. Have you tried the New Oregon?

A. Yes, I don't care much for it. There is this about the strawberry. A rule for a strawberry won't hold good a mile apart. I have had 80 varieties at one time, and I trucked away berries that fellows out on the hills said were fine stuff, so I concluded I don't know anything about them. We take all the berries no matter what they are like, but heretofore I couldn't cash in on them. But I can use them for our specialty departments. The price of course will develop with the quality of the berry.

You need facilities for handling your fruit here. You will not develop until you get more concentrated and better filled out facilities. You not only want your cannery here, and your cold storage there, but you want them together. When we get any kind of fruit down at Eugene, we have some three or four different ways to shoot it. We send it in the direction that it will pay the most money.

If it comes in Saturday night, we have a cold storage right by the cannery to hold it. That is what you will have to have to get the fullest values out of your fruits of any kind. Take our apples. They come into our packing room. We pick the best of them, that isn't many. The rest we grade again and they go over to the cannery, what comes out through the little holes, goes down to the vinegar works and to the drier for a chop. The parings and cores come around and go through the same process. The pomace from the vinegar plant is dried too. We try to handle every other article in that line. The fruit business is a business proposition, The manufacturing end belongs to the men who grow the fruit, so that they can go up and down with business conditions. None of the farmers have made any money this year except the fruit grower and he isn't in the best condition.

Q. How much does it cost to can Logans?

A. There are two items in your canning. I consider the gallon water and the syrup goods, your number 2, because you put most of your pack up in these heads. The water costs me $3.19 to pack a dozen number tens of logans this year, and sell them. Logans should be selling for $7. Some were sold for less than that. You have $3.80 left for your berries. It takes 60 pounds to make a case. If you get $7 you get about 6c for your berries. More were sold for $6.50 this year than there were for $7. At $6.50 you would still get 5c to 5½c.

Q. What percentage do you add for manufacturing?

A. We add 16½c to the sale price of everything we handle for overhead. This counts swells, insurance, dividends, taxes, fuel and power, interest, your office, general expenses, commissions and discounts. We figure dividends as an expense. The farmers have a right to interest on their money.

Q. Is berry production increasing anywhere in the United States except in the northwest?

A. I don't think so. I understand it is decreasing. If we don't get the price too high, we will have no end to the market. What we want is to stabilize the fruit business so we will know what we will get every year. We want to make it a business proposition and not a gamble.

Q. What would you consider the price each year that we should have to stabilize the industry?

A. It will have to move up and down somewhat. I think if we can get four cents for Logans under normal conditions, it will be a business proposition. But if we can raise them and get four cents and make good money and you get six cents, it spoils the business. I am a believer in keeping things on a generally good healthy business condition.

Q. What percentage of shrinkage in Logans and raspberries?

A. The shrinkage is accounted for largely here—60 pounds might not be high enough and yet I figure 25 pounds fo rmy 2's and 40 pounds for my 2½'s. We settle with the growers on the initial scale weights.

Q. Have you ever tried canning Himalayas?

A. I would rather have an Evergreen.

Q. What is your objection to the Himalaya, from your standpoint?

A. I find under rather adverse conditions, they will not fill out quite as well, and then I find them a little softer. I think the main objection would come from the growers standpoint. I don't believe they are as nice a thing to grow and pick, or as stable a thing as an Evergreen. We have no diseases and nearly always have a crop. I am satisfied it isn't as good a berry as the Evergreen. I don't believe it holds up as well in the cans.

I have been trying my best to get my growers to raise some Lawtons. I got about ten tons of them this year and I put them in high class syrup, because one of the big buyers was in and I showed him a can of the Lawtons with syrup and Evergreens with syrup, and he said give me the Evergreens. That suited us all right because we would rather have the Evergreen. The Lawton was a finer flavored berry but it didn't stand up near the top of the can as well as the Evergreen.

Q. Could you tell us anything about the sugar content as to wild and cultivated?

A. I think the difference is largely in the water.

METHODS OF PROPAGATION

By Henry Hartman, O.A.C.

Taking the grape first, the grape is one of the easiest plants to propagate, that we have. It is very easy to grow plants, much easier in fact than probably any other plant. The grape as grown now is universally propagated by what we call hard wood cuttings. That is by the cutting method, employing what we call hard wood cutting. Now this is nothing more than a cutting that is made from wood in a dormant condition, when the plant is dormant, such as it is in the winter months of the year.

With the grape we have certain factors to keep in mind in the selection of propagation wood. In the first place, we never use wood that is more than one year old. We take the canes as they grow during the past season and select that as our stock. As to the time of selecting this propagation wood it seems to me the season of the year after the leaves have fallen is probably the best time. I believe this is an advantage for the reason that the wood at that time contains a larger percentage of stored plant food than it will contain at any other time, because just after the leaves fall the canes are full of plant foods and as the winter progresses, these gradually come down and into the root.

Now then, as to the selection of the canes, or the wood that we are going to take, we have different types of wood on a grape plant. We have what we call a bull cane, or the cane that makes a rapid growth during the summer. You can tell these, they are generally suckers that come from the root of the plant, and the joints or nodes are very far apart, sometimes they are six or eight inches apart. We should avoid that kind of material. Select only those that have the short joints, where the buds are close together. Practically all the food material stored in the cane is stored in the vicinity of the bud. If we take this bull cane, you can see that we have less stored material per foot of the cane than we have where there is a good number of buds. Canes well matured, medium sized, have nodes close together.

We generally take these canes and cut them to the desired length which is all the way from one foot to fourteen inches. Possibly longer, sometimes shorter. We cut these, leaving about four buds to a cane, and tie these in bundles so the ends are all in one direction.

The best scheme for keeping those during the winter is to dig a trench out somewhere by a building or some place where the drainage is fairly good and bury those in an inverted position so that the basal ends instead of being at the bottom will be at the top, so that the cuttings are inverted. The reason is the first thing we want to develop in the cutting is what we call a callous. This is the first growth that takes place and generally during the winter, and is a growth that covers the cut that was made by the knife. Soon as it makes a callous, that cutting is safe, it will develop a root system. We have the basal ends near the top where it is going to be warmer. We are going to get the growth in the vicinity of the base of the plant where it ought to be.

During the next spring, when the time comes to set these out in a nursery row, we dig a trench out in the field, plow a furrow; then we take these cuttings and plant them, inverted again so that they are in the right direction, and cover the cutting so it is all covered but one bud.

During the summer that one bud will send out a cane, and the others will develop into a root system. I would cut very close to the bud, because most of the food material is right close to the bud and there is more of a chance for the callous to form and grow. Then it is very important that during the summer, that we give these plants good care, that we give them plenty of water, because the young plant for the first six weeks you will find has very little roots; it is dependent primarily upon the food that is stored in the plant itself and we have to give it good care or it is apt to die if it doesn't receive sufficient moisture.

Gooseberries and Currants

The gooseberry and currant are very easy plants to propagate. They are propagated in two general ways. We have the old system that has been used a long time, and is still used by some people, that is known as the layerage system. We have a plant with a large number of suckers, the plan would be there to simply cover a part of these with dirt so that roots will be formed in that way. They can be cut away forming a new plant. That system is used by some but there is one trouble with it. That is, it greatly handicaps the plants from which you take them, and is really a slow process.

The system that is used by nurserymen and the one I believe will prove to be more satisfactory in the long run is the hardwood cutting, the same as we used for the grape. The cuttings are made in the same way, generally a cutting of about ten or twelve inches in length, handled in exactly the same way that we handled the grape, handled the same in the winter and the same during the summer.

The methods of propagation for the small fruits such as the brambles, most of you are familiar with. The blackcap and the Loganberry you have to propagate by layerage, laying the tips to make roots and using those tip grown plants. The propagation of the strawberry is also a very simple process because the strawberry plant naturally develops runners and young plants. In fact one of the biggest drawbacks of the strawberry is to keep off the runners so it will keep bearing.

We hear a great deal at this time about the matter of pedigreed nursery stock or pedigreed strawberry plants. Some firms advertise plants for sale that they claim are taken only from plants that are strong producers, and that by taking plants from this kind of a plant, you get a plant that will set more fruit. Experience has shown pretty conclusively that there isn't a great deal to that. Strawberry plants are one of the type of plants that are very stable. You don't get much variation within a variety, that differ from the other plants. They are practically all the same. So when you get a superior producing plant within a variety, the superior production of the plant is usually due to the soil, to the amount of care that the plant has received, rather than to any innate difference between the plants within a variety.

We had thirty-five varieties of grapes that fruited this year. The Concord Worden, the European varieties such as they grow in California, the Sweetwater, and Chasselas. It seems to us that out of that list there are a few varieties that are especially promising. Campbell's Early is one of those. This is really a cross of the European grape and the native American grape. It has some superior qualities, not that it is a better grape, but it seems that the berries hold on the bunch especially well. Campbell's Early held up in shipment, and had large berries.

The Red Chasselas is really a late form of the old fashioned Sweetwater. It is a real early maturing European grape. Then the grape is especially attractive and has a sort of purplish pink like the Tokay, and the bunches while not very large, are at least attractive and would sell very well in the market.

The quality of the Campbell's Early is probably not quite as good unless it is left on the vines until it is fully ripe. The grape like the Worden is hard to beat for a native American grape. Moore's Early doesn't set a very large bunch, they are small bunches and as a rule, doesn't produce very heavy. The grape is all right, it is an early grape, matures well and develops sugar.

Campbell's Early is firm on Noverber 4th or 5th. The Island Belle up around Tacoma, growers believe is the same as Campbell's Early. This variety can be procured in Oregon of all nurseries. The Red Chasselas is common in California, and would probably have to be procured from California. The Worden falls down as a shipping grape because the skin seems to be tender, it cracks, and is good only as a home grape.

LOGANBERRY INVESTIGATIONS

By A. L. Lovett

In trying to think of the different insect pests that should be discussed, I am going to mention the least important, or the one I will get through with in the most concise manner first, and that is the strawberry insect and for our purpose I am going to divide them into two classes, those that work on the foliage, and those that work on the roots of the plant. Of those that work on the foliage, I would say that when all is said and done, we don't have many serious foliage eating strawberry pests at the present time in western Oregon, and up in the Milton Freewater section and in the Hood River Valley we do have the leaf roller, a pest that works on the foliage of the strawberry and is serious but for general purposes then we can eliminate as a serious pest the foliage devouring pests of the strawberry.

Of the root infesting forms, I would say there are really about three or four that are serious. The most serious of all are the so called root weevils. In general they are confined at the present time to the more northern counties of western Oregon, but they have been present there for a number of years and have certainly since about 1909 or 1910 and succeeding years, limited the profitable production of strawberries. We worked on the problem of the strawberry root weevils for three years trying to find some way of handling them.

Any underground insect presents a difficult problem. It is almost impossible to find a spray or soil treatment that we can use against them, and after working for practically three years on the root weevils, we have found about the only way to handle them was by very short rotation. Growing strawberries only one crop year and then plowing up the field immediately after taking up the berries. This seems like an unprofitable proposition and yet in many sections they are using it. In closing on the root weevil I would say at the present time, there is a state quarantine against selling the strawberry plants from weevil infected sections, and it is an important thing. The strawberry plant industry is one of some considerable importance and certainly in any plantings where you are planning to put out strawberries, see that to one feature particularly, that it bears an inspection tag showing that those plants are grown in a section free from weevils, if they are Oregon plants, because this root weevil is the premier so far as a serious pest is concerned.

The two more common root infesting types are the crown borer, and the crown miner. The crown borer is a rather good sized white grub working up and down the tap root and into the crown of the strawberry plant. The miner works in the same locality but is very small, pinkish larva, that makes little holes here and there through the tap root and crown. We haven't anything in the way of sprays and soil treatment that can be used, and simply recommend rotation of crops.

The crown borer is really a common pest, it is everywhere so far as I know in the state of Oregon. Following our observations on it in the older strawberry sections I think it will usually not prove profitable to attempt to grow strawberries more than two full crop years, plowing them after the second crop year. As the industry develops in any community, the more plantings and more segregated districts develop, the pest increases in importance, and you will find it desirable to plan a rotation that includes strawberries on that soil but two crop years.

I don't figure that the strawberry insects in the case of the root weevils that are limited in their distribution at the present time, are especially serious. But with the borer it will become serious in the old plantings.

In the case of the currant and gooseberry insects which I want to discuss next, I feel that probably the most important of these is the maggot that works in the fruit. Usually it causes a premature ripening of the fruit. In the case of the currants particularly the fruit generally drops. We do find in most cases a very heavy infestation by the worm. In any little home plantings of a few bushes it is not unusual to find up to as high as 90 per cent of the berries infested.

The adult is a little light yellow fly about half as large as a house fly, and it appears in the fields at the time when the berries (the currant fruit) are just about two-thirds grown. They are sun lovers and will sport about on the foliage, lapping up the dew and any moisture that is present, and are usually present for about a week or ten days before they begin depositing their eggs. They have a rather peculiar arrangement at the tip of the body, that permits them to slit he skin of the developing berry, then they slip that egg in the slit under the skin and seal the little incision that they have made. That egg will hatch in about two days and the little maggot will begin tunneling around under the skin, about a third of the way, then starts for the center of the berry. It will usually go inside the seed first because it is still very small, and eat out the interior then come out and web the seeds together and eat out the interior of what is left.

This activity causes a premature ripening of the fruit, and discoloration of it and frequently causes the fruit to drop. When it is mature, in about two or three weeks after the egg is laid, it will leave the fruit, whether the fruit drops from the bush or not, and crawl down into the ground about one and one-half inches where it changes into a little brown capsule. The skin just inflates, it hardens into a little brown case around that maggot and within that case then the little maggot transforms into a fly again. It remains here in the soil in that little brown case until the succeeding spring and is present in the surface soil for approximately 11 months of the year.

When we began working with it, seeking better methods to control it, because it has been for years a pest, we tried out sweetened poison bait. They were used successfully against the native fruit fly in the islands. It works all right for this maggot fly but at the season of the year when that fly is active in the field, we have a week or ten days that we might poison it, but almost invariably we have frequent showers, and if it rains it will wash off our sweetened bait and it is no longer effective. After two years trial of it, it was not uncommon where we would go out in the morning and put it on the bushes, then there would come a little shower in the afternoon and wash it all off. We practically decided while it is effective if we get it on often enough, it isn't practical.

Down in the plantings at the college where we thought we would carry on some investigations, we found we couldn't get enough infested fruit to work with. We found it was simply that they were giving them, as opposed to the home berry patch, much better cultivation. We at the present time are recommending simply better cultural practices for the control of the maggot, along with other things.

But if you will appreciate the fact that practically 11 months in the year those little insects are in the top surface soil, and any method of stirring up or working that soil that will expose them to birds, other insects that prey upon them, adverse weather conditions and a variety of other unfavorable conditions for them is limiting the number of those flies that will come out the next spring to infest the berries.

Some practical means of collecting the infested fruit should be mentioned. The use of poultry in the plantings after the fruit is gathered, simply raking that surface soil and debris to the center of the row and allowing the chickens to work that over. Then the stirring early in the spring of the soil immediately around the bushes in that area where the maggots will drop late in the summer, will be measures that will limit the seriousness of the infestation resulting.

Another insect that works on the currant and gooseberry much as the fly works on it, is the saw fly or currant worm. I will tell you how we get the name of saw fly. That is, the adult insect that makes the worm is a saw fly. The general description and life history and habits of the currant and gooseberry worm will work equally well for the saw fly and the Loganberry worm. The treatment is the same. They are very closely related and the control is practically the same.

The adult, which is called the saw fly, appears in the spring of the year, about the time the fruits are in blossom; in fact they feed to a very limited extent on the pollen. This adult is a little blunt, robust looking, wasp-like creature. Instead of having that constricted body, it has a very robust body about a fourth of an inch in length. They have a saw-like oviposture at the tip of the abdomen and resting on the surface of the leaf they like wise will saw a little slit in the leaf surface and place the egg right in the thin layer between the upper and lower surface of the leaf and seal it so those eggs appear as little blisters within the interior of the leaf but around the margin. Those are deposited about blossom time, and require about eight or ten days to hatch, and the little worms crawl to the surface of the leaf and begin to feed. Most of us don't see them at work, they are a very small worm. But you will find very small holes appearing on the leaves. They feed there for a week or ten days, when they get some size, then begin the skeletonizing of the leaf, avoiding the veins and midrib of the leaf, giving it that peculiar skeletonized appearance. After the fruit is developing and as they increase in size, their appetite and feeding ability increases, and defoliation becomes very rapid indeed about the time the fruit is beginning to assume some size and the question of whether to spray or not does bother us somewhat.

In the case of the currant and gooseberry maggot, there is another generation along in midseason that works in the same way. Those worms, when they mature, drop to the ground, tunnel in a short distance, spin a little parchment case around themselves, and in that little case, transform again to the adult saw fly. They pass the winter in the soil in that little case which is practically impervious to moisture, heat or cold and emerge in the spring as a saw-fly again.

The sprays I have recommended of arsenate of lead are safe for any of these defoliating forms on currants, gooseberries, Loganberries, and raspberries, and it amounts to this, if you have had them in limited numbers this season, you can figure you will have a good dose of them next. The ideal time to spray is just after the blossoming period if you can. They are smaller worms at that time, more easily killed, and don't have the opportunity to get in their destructive work and destroy a good deal of your foliage, and you don't have that agitation regarding the possible poisoning of your fruit. In the case of the gooseberry and currant, the time they defoliate is just about ten days before you would ordinarily begin picking. Then to spray with an arsenate spray, it will leave enough of a coating to make a cannery hesitate about accepting your fruit. In a case like that if you do wait so late to spray, you can use white hellebore, as a substitute for arsenate of lead where you are hesitating about the possibility of poison. In the same proportion, 1 pound to 25 gallons. In applying that spray to Loganberries, raspberries, etc., if you can arrange an angle nozzle to throw the spray up, get under the surface of the foliage, that is where they feed.

With these foliage feeding types of saw flies, on Loganberries and raspberries and on the Logans so far as our records show they have been pretty serious, in Washington county and in Lane county, but they are something to be watched for because they can certainly damage a patch. After they once come and you see them, they are going good and will require prompt action if you are going to save foliage enough to mature your crop. The ideal time is to spray just as soon after blossoming as you can get at it. Arsenate of lead, two pounds to 50 gallons. That is stronger than you will need if you can get it under the leaves.

Loganberry crown borer, which here and there at least has been causing serious injury ever since the Loganberry became a commercial crop in Oregon. As far as our records go, apparently this crown borer (which by the way is common in the east, where they know it as the Rocky Mountain borer—we call it the Loganberry borer), attacks any of that type of crop, the blackberry, Logan or raspberry. We find it also present in the Mt. Tabor section on the blackberries and raspberries back as far as we can get any record of the plantings of the blackberries and raspberries there. So it was probably introduced from the east with the early berries and has been present in our commercial Loganberry fields.

We first began to consider it as a serious pest in 1911 and did some work on it during 1911, 1912 and 1913. Briefly, concerning the insect that we have to deal with here, most of you I think, know the worm which you find sometimes in the severed canes, sometimes in the crown itself. It is a first cousin to the strawberry crown borer, a long white worm with a brown head slightly constricted where the legs occur, but it is a fairly long worm about three-fourths of an inch in length, working in the root system, crown, and up into the canes of the fruit. Where it is allowed to go, it will weaken or practically kill out an individual plant in time.

The adult is a moth or miller, only it is a rather unusual type of miller, in that instead of having wings with scales over them, it has wings that have practically no scales on at all and instead of flying at night it flies in the daytime, with a buzzing sound and you would call it a wasp, but we call it a moth. They appear in the fields along in August and are present and active through August, September and early October. They light on the margin of the Loganberry leaf, bend their abdomen over and under and deposit the egg on the under surface of the margin of the leaf. That little egg is shaped just like a little round cooky, a little brown object sealed or stuck to the under surface of the foliage. They require from 20 to 60 days before they hatch. It will be along in early October principally that these little worms begin to eat their way out through the hard shell of the egg, and on some of those canes where they are a great length, that little worm almost invariably will ravel down that cane. It averages about six inches every five minutes when it is going good, keeping on the side away from the light until it comes to the crown of the plant. That is in the fall, and it will eat its way just under the bark of the crown or foot just below the surface of the ground any where from just at the surface down to two or three inches below, and form a little cell there—we call it a cyst—and there it spends the first winter.

In the spring, in fact in late winter, it becomes fairly active and begins to eat its way into the tissues, working upward and by the time that the young canes are well started it is up into the tip of the crown and begins to work its way out into the new season's canes. It will ordinarily work up a matter of an inch or two, or more, but some little distance up the cane, then will work its way out (it is nearly half an inch in length now), to just under the bark of the cane, and then girdle the cane at that point.

Apparently, in the case of the blackberry frequently, where they come up and girdle the cane that way, it fails to kill the cane. The blackberry is vigorous enough to go on and grow and the worm is killed in a case like that. Its purpose there of girdling that cane and killing the cane both are part of the process in its life. Ordinarily it will then work on up a few inches, We can't give any special distance, but along in late fall again turns and works down into the crown of the plant. There it spends the second winter in the crown. The following spring it will usually work around in the crown more or less, beginning along the last of June or early July to work its way upward again. In this second summer it will work up into one of the several canes, theoretically I suppose it had intended to come back up to the girdled cane but we find them in canes that have been cut off in trimming out, as well as anywhere else. It will work up into one of the dead canes, or dead stubs, and will eat its way out to the bark, leaving just the outer derm intact, then drop down and form its chrysalis, in which it transforms into a moth. Along in August when that moth is ready to emerge from that chrysalis, the chrysalis will begin a rocking motion, and there are little spines and it works its way up that tunnel until it projects two-thirds of the way out and you will find that chrysalis sticking out and from that the moth emerges in August to repeat the cycle, requiring two years. There are moths appearing every year, we have enough successive generations so we have them present and active every year.

The thing that seemed most feasible to me at the start was to find some very caustic spray that would knock the foliage off those plants after the berries were all picked so there wouldn't be any place for the moths to lay their eggs, but that hasn't ever worked out as a practical proposition at all. We tried a number of sprays against the eggs, and they didn't have any effect whatever; you couldn't kill the egg with a spray. So we have developed and are recommending as Mr. Brown indicated this morning, a proposition of watching for those girdled canes. During your trimming work in the fall those girdled canes will show up healed. In any event if you find those healed canes, if you grasp them, give them a twist, they will sever at that point. Where you are trimming them up, that will probably sever them. In the majority of cases, that worm will be in the severed cane, but sometimes they will have gone on up a little distance, started back down and will be in the stub somewhere, so ordinarily we recommend to simply carry a crooked wire along over your belt, give them a twist and a pull and then take the wire, stick it in the end and wiggle this around and that is sufficient ordinarily to hold down the Loganberry crown borer to a point where it isn't of any economic importance in your planting.

If you had a field where they are really bad, another system would be along in the summer, in July sometime when those mature worms are coming up to change to their chrysalis and come out in the moth; take some kind of a blunt tool that won't bruise up the growing vines that you can break off or knock down those stubs, because in those old stubs is where the chrysalis will be during July, and by knocking them over or crushing them you would have crushed the chrysalis that would be a moth later. I think most times the proposition of handling the girlded canes will suffice for the trouble.

One very common type of injury in raspberry, blackberries or Logans, is a row of punctures up the side of the cane, a line or row of small punctures up and down, varying in the number of punctures present. Cutting in there you will find little yellowish objects like grubs or something but they are really eggs, of a cricket that we know as a tree cricket. They don't stay on the ground but crawl up into bushes or trees.

When they hatch out in the spring the little crickets feed on leaf and aphids and any kind of little life they happen to find. and are of no economic importance. The only point where they do affect us is in the egg deposition of the adults, and where they are present in numbers, it will certainly weaken the canes enough so if it has any play at all in the wind, it will break at that point, and it may limit the size of the berries, because of mechanical injury present. It may be necessary to begin watching for canes that are infested, cutting them out and burning them. We have no sprays and nothing can be done more than watching for and eliminating those egg infested canes.

Finally I would say that we have report from only one section about a rather interesting insect. The little bug, on nettles, thimble berries, etc. Right on the tip of the growing plant you will find a little bunch of foam or spittle, and in the center you will find a curious little bug. We had specimens sent in of Loganberry tips from one place this year where the spittle insect had attacked the growing tip and killed the canes back about two to five inches, blighted them by the poisonous effect of its puncture. I would be mighty glad to get samples if you find any of it, and see if this is going to develop into anything important. That I think, is all I will try to take up at this time.

Dust Spray

We haven't tested it on Loganberries. I found on truck crops of practically any kind where you have to use a spray, I prefer the dust. You can get over so much ground and do it as effectively with a dust arsenate or anything of that kind. It should work the same on bush fruits. In fact that is about the only way you can spray a strawberry. Up in Milton-Freewater sometimes the spider mites are very bad. We can dust them with sulfur and get some results. We haven't tested it. I would consider that it ought to be a very economical and thorough method.

It would be worth using a hand spray rather than not spray, on a five to ten acre patch, but it would probably pay later to get a type of sprayer that would work. They should be able to develop a geared sprayer for low growing plants.

Two pounds of arsenate to 50 gallons, or 2 to 100, for orchard spraying is sufficient. If you leave Logans until the worms are pretty near mature you ought to increase your arsenate a little; 2-100 is sufficiently strong to get them if you spray thoroughly.

Casein

Tests have been confined to orchard spraying. It increases the wetting power of a spray. On a Loganberry leaf, with tendency to pubescence the spray will tend to collect in droplets so that a spreader ought to give it a better wetting. Spray sticks better with a spreader.

Do these insects attack the Evergreen blackberry? I don't know of any of them that get very far. We could find some plant probably, but don't know of a case of serious infestation of crown borer, nor a case of sawfly where they were really bad. If we planted the blackberry more extensively we might not only have these but might get some new visitors. It is a reasonable supposition, it is the history that a new beginner has comparatively little trouble but any district that makes solid plantings of some crop, gives ideal conditions for the development of pests.

THE STRAWBERRY IN FLORIDA

By Vane Gibson, U. S. Department of Agriculture

The strawberry deal in Florida is principally located around Plant City, in the westen central part and around Stark in the north central part. They pick their strawberries very much as you pick apples here. They are just commencing on their crop about this time, and from now on until the first or middle of March they will be selling their strawberries. They ship in pony refrigerators. The principal varieties grown are Klondike, Missionary. They seem to be very good shipping varieties, rather hardy. The pony refrigerators hold from 32 to 80 quarters. The labor in picking is all done by the negroes, and the packing is done generally by the growers' family.

In 1918 we found they were placing small and somewhat gnarly berries in the bottom, then facing with the larger berries. In our investigations we tried to find out something as to the quality of the pack and how it ran to the box. We dumped out several boxes in Plant City and took pictures of them and made some counts, and the growers thought we were going to get after them on misrepresenting the pack. The next year the pack was greatly improved. Some of the commission men said that was one of the biggest benefits the government ever did, was to take pictures of the strawberries, because it improved the pack.

The grower receives from 45c to as high as 75c and 90c a quart for his berries. They bring them in in every kind of a rig imaginable, drawn by horses, mules, a few Fords. Once in a while you see a man drive in with a Buick but that is the exception.

They bring in from one to half a dozen crates. They wait there until they think they have the best price. The dealers look over the berries in the wagons as they are brought in, and fill their orders in that way, paying the prices mentioned.

In Louisiana, the deal was principally around Hammond, about 90 miles north of New Orleans. Their principal variety is the Missionary with some Klondike raised. The berries as a rule are smaller than the Florida, but they ship in carload lots instead of pony refrigerators. They auction their stuff right there before it rolls out. They have a very strong association in Hammond and it is predominated by—that is the larger part of the members are Italians. They report to the association every day the number of quarts or crates they expect to bring in, and every town up and down the line reports the same to the association. Then shortly after luncheon they go into the auction room, and the president of the association auctions off these cars. He states he has a car on track at whatever station it may be, will roll that day, and the dealers all bid on the car there just the same as at the auctions in New York and Chicago bid on the apples that are put on the auction here.

Some of the troubles they found in shipping strawberries from both of those sections are the manner in which they are handled when they are packed. Strawberries require extremely careful handling. We were trying to eliminate a lot of bruising that was being done. The principal disease giving them trouble down there is botritis.

Careful handling, placing the berries in the box at the time of picking, and not having to sort them over gives better results than where they were carried to the shed and sorted. They make big money in Florida. Of course they are shipping now and the stuff they ship now goes to New York, Philadelphia and Chicago for the Christmas trade, and because it is out of season in those markets, it does bring enormous prices.

The dealers get from $1.10 to as high as $1.25 a quart box for that stuff on the New York market.

Pony refrigerators are a box 80-quart size, about 3½ feet square, and down through the center of the box there is a tin pan the depth of the box and about 4 inches wide, filled with ice. Then the boxes are placed on each side of that pan, and when it is filled up to the top of the center pan, there is another pan goes in on top which is also filled with ice, and they weigh arouond four or five hundred pounds when loaded. The ship them out by the carload. They reckon their crop in quarts. They get these pony refrigerators back at the empty containers return rate. They have quite a time getting them back in time, if they don't get them back it has the same effect as a car shortage. Pony refrigerators cost anywhere from $5 to $10. The grower sells crate and all, he buys his crates and baskets and then sells the whole thing.

OBSERVATIONS IN HANDLING VARIETIES OF BERRIES

By M. O. Evans, Field Manager, Oregon Growers Cooperative Association

We consider that it is one of the important things of a cooperative association to disseminate as much information as possible about the best kind of fruits to raise. And in my opinion there isn't anything that needs attention any more than the strawberry business if we are going to get any place with it. There aren't very many varieties of Loganberries—if there were I think we would have them all right here—fortunately there aren't—they are all about the same. The same thing is true of raspberries. There aren't so very many varieties. I don't know how many varieties of strawberries there are, but there are a great many more grown here than we ought to have and there are more that may be grown if we don't do something to stop it.

An association of course can do more along that line. You will find where associations are the strongest in any district, that they have specialized more in their fruit and got better varieties to handle. I think that is one of the things we can do the most work in. There is more chance for improvement, I believe, in the strawberry business than any thing else, almost, from that standpoint. We have a great deal of competition in the strawberry business. They can raise strawberries pretty well most every place in the northwest, and we are not especially early in the Willamette valley. We do not handle strawberries any place except in the valley and at The Dalles, in fact last year, we might be said not to handle any anywhere except Salem, but we will this year, perhaps at two or three points.

We have to figure largely on something else—canned or barreled—rather than shipping fresh. It is unfortunate you can't dry strawberries satisfactorily. It hasn't been done to any extent. That is a good outlet for almost everything else as well as prunes; but we haven't got much of a fresh outlet for them, at a very good price so we must raise varieties we can either can or barrel. Never having had an association around this part of the country to give any attention to the strawberry business, everyone has grown about anything he happened to think would be the best or some other fellow told him would be. We have at least four varieties that are grown to a considerable extent, besides several that are grown to a very much smaller extent.

I am aware that the canneries will tell you an awful lot of different stories. I have asked several who handle berries, what varieties they like to can the best, and I have been surprised to find there isn't an awful lot of unanimity; they will all agree on one or two. Some others they will say are all right, some will say they are not, but I think we have a fairly good idea of what most of them think. I am going to ask some of the berry growers here to say a word or two. I simply know how much trouble we have in trying to handle them before they get so we can't market them.

You take Hood River. Mr. Gordon G. Brown will probably tell you how they specialized. They found one particular berry the best for shipping and they stay by it, but here we haven't had anybody to direct our footsteps, so we have the Oregon, Trebla, Ettersburg, Wilson, Magoon, a few Marshalls. Let us take each variety and see what we think of it.

The Oregon is an awful good berry to eat, it is good for home canning. I wouldn't want a better berry for home canning. If we were a little earlier, possibly we could get more money out of the fresh market by shipping fresh. In spite of the fact it is good for home canning, the canneries do not like the Oregon. Some didn't want it at all last year. Some took a few. While we canned the berries at Falls City and Corvallis ourselves, they took the Oregon, but the canneries we sold to didn't want any Oregons. I think some of the canneries have canned some, but it isn't considered a very good canning berry. It is a good berry to ship, stands up nicely, and for the midseason market, I think there is fairly good money in it. They say the other varieties make better canned goods. We sold 35 tons to one cannery, and they hollered every time they saw an Oregon.

Mr. Bill: "The Oregon breaks up in processing."

The man who had charge of our barreling last year didn't want us to barrel any Oregons. I don't know whether he was right or not. We didn't start this association with very much intention of handling strawberries. It was one of the minor crops and two years ago, our first season, we only had about 25 tons, and we sold them to Ruperts along with the cherries and Loganberries and didn't think very much about it. But it seemed there were a great many of our growers who had berries that didn't sign them up, and they got rid of them two years ago and didn't say much about it. They are a crop that doesn't last the full term of our contract very often, so we didn't bother about them.

Last season, 1921, we suddenly found our growers had a mighty big lot of strawberries. When the market looked pretty poor and they didn't know where they were going to sell them, they began to flock in and want us to handle their strawberries, and instead of 75 tons we thought we might have, before we got through we had over 150 tons. We stood by and helped out our members, although we did refuse to take anyone in who didn't have anything else and had never been around to see us before.

We were unable to get hallocks because of high water flooding some of the mills and not much of a supply having been made up—

market conditions were so uncertain—so we couldn't ship very many of the berries. As things turned out we could have done very well shipping a considerable quantity, if we could have secured these hallocks. We had calls from places where ordinarily we couldn't sell any berries, if people nearer to them had had hallocks. We hope to do more of it next year.

The Wilson is a mighty nice all around berry; there is only one thing the matter with it. It does run out and get small if it isn't on good land and given good attention. There are growers who grow mighty big Wilsons. We had more trouble with small Wilsons than any other variety. Some were so small the canneries didn't want them at all. The women couldn't make any money hulling them. In barreling, we had the same trouble. The canneries like the berries fine, and if you get good size it ships and is a mighty good berry.

When it looked as though we would have to barrel some berries, we barrelled 107 barrels and used Wilson and Ettersburg, they worked in nicely together. We shipped the stuff to Chicago; they said it was the finest product they had ever had. Two pounds of berries and one pound of sugar. We hope to do considerable business along that line this year. Only one cannery said they didn't like the Ettersburg 121. The great objection to that two years ago was that it didn't set any fruit. There would be fine looking patches but wouldn't get much fruit. That condition wasn't true this year. I have talked with twenty-five or thirty men and none had any kick on quality and quantity of crop this year. It has a good flavor—fresh—but doesn't seem to be so different from other varieties canned. Canneries liked it fine. One hadn't ever heard of it in his district. He said he would rather have Wilsons, but would try them. After three or four days he said: "You can send me all of those you want to." They ship fresh very nicely but they are late. If a fellow wants early berries he doesn't want the Ettersburg because they are too late. Fellows up at Scotts Mills had a crop late in the summer.

The other berry grown in large quantity is the Trebla. Two years ago it seemed to do particularly well, the canneries using a large quantity of them, and they produced a tremendous tonnage to the acre. A lot of people started planting more. We certainly did have an awful time with them this last year. One year they did pretty well and the next year they did poorly. Climatic conditions seemed to be good for the Ettersburg but bad for the Trebla. They are inclined to get black over night after they get to a certain stage and if they are not handled awfully fast you will have trouble with them. With a small acreage you wouldn't have so much trouble. Some fellows had six to twelve acres but they couldn't get them in to us in condition to handle satisfactorily. You can't be a day behind in picking the Trebla. Had to dump several hundred crates at different times because they wouldn't be any good for canning. They are a pretty berry, but if they get overripe, by the next morning they are too far gone. You can't do anything much but barrel and you can't use them with other berries because they are darker. The canneries don't want them, or didn't last year. We will probably have to barrel the Trebla another year. Hunts canned a great many two years ago ,and some of the growers said there wasn't any particular kick with them.

A Grower: Has 28 acres of berries—Wilson 121, Oregons, and Treblas, on hill land. Shipped Treblas to Astoria and shipped Wilsons, and the buyer said they wanted 20 crates more of Treblas the next day, and be sure and send Treblas instead of Wilsons. Have shipped to Butte, and went in good shape. I took more pains in packing them, pack with the stems on, don't wait until they get too ripe. Last year all the berries were soft on account of the rain. Treblas should be picked every day especially if the season is rainy. Like the 121 best for home canning, and would put the Trebla second. Neighbors like the Trebla; they retain their shape and color in canning.

A Grower: Said pick them as soon as red on one side, and had no trouble in carrying and keeping in good shape.

Van Trump: On rich soil they set too full to mature. They don't get above half size and color before they ripen. Don't succeed on heavy soils, evidently a berry that needs to be grown on hill soil.

Hartman of O.A.C.: One outstanding fact about the yields of the berries, the Ettersburg as a class produce more fruit than the other varieties such as Wilson, Magoon, and Oregon. The Ettersburg produce just about as much as the Trebla under similar conditions. The vines of the Ettersburg varieties and the Trebla, grow much faster and when grown on heavy soil, grow too rapidly and—. For the lighter soils possibly it would be better to plant those varieties and they will give a bigger berry and possibly be much better. For the relatively rich soils it seems there might be a tendency to grow too much vine. O.A.C. tests show the Ettersburg produce very well. Didn't have any trouble with it pollinating. The 121 blooms a long time, and sets fruit for a long time, and taking the entire season, the tonnage seems to amount to quite a bit even though it may not at any one time.

Another Grower: The season comes on so late that they come in on other fruit's seasons.

Harry White: Serious disadvantage in coming on late. If the soil has a tendency to dry out, they incline to be quite small towards the end of the season.

Van Trump: Difference between the 121 in different years. One patch bore only about one ton and last year it bore about four tons —the same patch.

Tower: Is there any outlet for the Trebla as a jam berry? Should think there would be, only we can't mix it on account of having a darker color than the other varieties.

Lewis: The jam business this last year was dead. There were only two or three concerns in the Northwest that put up much jam last year. Believe it will come back the way canning business is doing. The jam people often use quite a lot of softer berries—the Marshall, Gold Dollar and berries of that type. Mr. Paulhamus says he prefers the Marshall for jam purposes. Probably can use a good many of these varieties for that purpose.

Evans: The Wilson variety. We didn't have anybody kick on anything except the size; they barrel fine, can fine, but toward the end of the season, when it gets dry the berries get small.

C. A. Ratcliff: The Oregon berry, for me, has been very satisfactory for two reasons. One is, I think the soil and the location where I am situated is especially adapted for the growing of the Oregon, and the other is that since it does grow an especially good berry in that locality, I have used the local markets quite extensively, and as a table and home berry it is surely unexcelled. Therefore I can get the cream of the market price for my berries. I do specialize on them. I find that they will keep well too, after they are picked and as opposed to the Trebla, you have to pick the Trebla green or else it will spoil. You can let the Oregon go until they are dead ripe on the vines, pick them and they will still keep in good condition for three or four days. I can't understand why a cannery can't can a berry that you can can at home. The color after it is canned is certainly good, distribution through the juice, the berry is still whole, large size, flavor is good.

White: Quite a little shrinkage in the Oregon, more than the other varieties.

Ratcliff: Any berry shrinks considerably. If you pick the Oregon before it is quite ripe, it will be too light a color. You can pick it ripe, and it will hold up. That jar was canned from extra ripe berries. I don't believe the Oregon will do on a low land or on the thin hill lands either. That leaves rather a limited ground on which to grow the Oregon. My land is just between, has a little bottom land and slopes off the hills. And on the bottom land I cannot grow the Oregons. We must have the slope between the red hill lands and the dark land of the bottom. It is the only place I can successfully grow the Oregon. I find they are reasonably early, earlier than the Wilson, but not so early as the Gold Dollar, and they bear a very long season. Had them grow side by side with the Ettersburg and the Oregons were the last berries we had. The season of the Oregon was about twice as long as the season of the Ettersburg for me.

Bill: We don't grow many strawberries in our section. In talking about the Oregon, a cannery in San Francisco has the objection that they were very large, and break up in processing.

Ratcliff: Why do not canneries put up preserves as well as jams and canning?

Lewis: The preserve has been more of a specialized business. Some of the canneries are doing something along that line. The Brownsville Canning Co. at Corvallis, make a preserve that is very fine. They are feeling their way out, but it is a matter of merchandising. This business has been more in the hands of foreign manufacturers than the American. Cross and Blackwell are doing a huge business, have standardized their product, and stuck to their brand and have advertised their brand; put specialty salesmen in the orient and all over Europe and the Atlantic seaboard we find these preserves. Not enough berries raised in the east to go into this business. Practically all they raise are eaten fresh. If the preserve businss is dveloped, it must be in the northwest. Takes time and money to introduce a new product.

Grower: What variety does the association want us to grow mostly?

Lewis: I believe no berry business will ever be developed on one variety or one outlet. We will probably grow four or five varieties right here. We have got to develop every outlet there possibly is. There is a market for the early Gold Dollar, and there is a very good market for the Oregon. There is a possibility that the late Gold Dollar and Oregon should be barreled or used for jam. There is a demand for shipping strawberries, then there is a big demand for the canned berries. We have got to develop everyone of those outlets..
I have been strongly impressed with the Wilson and Ettersburg in canning. We opened a can of Ettersburg yesterday and they were all solid, not a broken berry in the can. The first thing is to find out the soil and growing conditions, second the method of handling to get them to the market in good condition. I don't believe we are going to get down to any one variety of strawberry.

A Grower: R. R. Graves, R. 3, Salem: I tried four of the Ettersburg varieties, the Eureka, a soft table berry, good flavor, good for home use but too soft to can. Ettersburg 80 is a very solid berry, holds up, is a very sweet berry, not a very deep color when canned but good flavor. Tried drying two of the Ettersburg varieties; one variety called Ossey, Little Bear, large, almost white, is the most solid sweet berry I ever saw, dries well, and then in cooking it is something like the dried Logan, regains size, and holds its flavor, but has almost no color. Tried some of the Ettersburg 80, makes a most excellent berry but not as good as the Ossey, but it is more solid and sweeter than any berry I ever saw in that line. The Trebla is almost too small for home canning but canneries like the color and size. I counted over 200 berries on one plant of the Trebla last summer.

BERRY GROWING IN THE WILLAMETTE VALLEY

By G. A. Miller

I don't exactly agree with the Washington system of training. He claimed they planted their berries 7 feet between the rows, then extended this out for fourteen to sixteen inches, some cases farther. You can do your own figuring—there isn't room enough to cultivate.

I will give you a little history of our yard. In the spring of 1916, I got the blackberry bug. I had been growing Logans. I have grown Logans for about 14 years. There was a canner approached me from California, wanting to contract for a term of years as may acres up to a hundred, as I cared to grow. After figuring with them for a month or more, I thought I could see a little money in it and entered into a contract. Our land was new land and it was covered with stumps from ten inches up to six feet in diameter. We used powder, stump pullers and hand labor and got it grubbed. In fact we have about fourteen stumps on the seven acres yet. The berries don't seem to object, but they are in the way of cultivation. We finished our grubbing very late. We didn't get enough help at the wages we could afford to pay, and it was some time in May. Pretty late to set berries, but I wanted to get them out. We went to the woods, picked our plants. I firmly believe there is quite a difference in the plants that are growing wild in the woods as to bearing qualities.

We got into an old cattle corral where there had been a large stock shed. This yard covered about three-fourths of an acre and it was a perfect mat of evergreen vines, 22 to 24 feet in length. We took brush scythes and hooks and cut those off, cut the tops out of the way. Then men with grubbing hoes grubbed these plants. A man with a hatchet trimmed them. We didn't aim to use any but what had small rootlets. We aimed to get three or four small roots. Cut the stem off 12 to 14 inches, throw them in hop sacks and took them to the yard.

We lined our yard off 8x12 feet. I notice they advocate 16 to 18 feet, in some cases as high as 20 feet, but I think it is too far apart. I think, even though I have to cut our vines off which we do, they grow from 16 to 20 feet in length. We took shovels and dug our hole about 16 inches across and 15 to 16 inches deep. We dropped the plants along, kept them in the shade as much as possible. One man with a shovel would throw in a little dirt and we put a man weighing about 210 pounds, and he got in on top of the dirt and kept tramping. We lost very few plants. In any planting where your ground is dry, it is good policy to tramp the ground good and hard around the roots.

The first year we grew beans, potatoes, and corn between the plants, that is, between the rows. We cultivated pretty thoroughly. I suppose we averaged about five feet. We had from one to three canes. When you take your root for planting you will find little nodules showing a little pink which designates how many canes will come from that part of the crown. Some of those grew six or seven, eight to ten feet, depending on moisture conditions and also on how the plant took hold.

We had a good crop of beans, an excellent crop of potatoes, and grew some corn. I notice they advocate interplanting corn, but if anything I thought I could see a little difference in favor of the growth of the berries where we planted the corn as against where we planted the beans, I think due to the shade of the corn. The Evergreen is a lover of shade.

The second year we cut those vines back to probably 20 inches in length so we could cultivate them both ways again. That year we planted some beans, a few potatoes and some peas in between the rows. We didn't get very much of a crop of anything in the garden line, but we got an excellent growth on our vines. That year we averaged three pretty good canes to the hill. The following year we set our posts during the early winter. We had our berries 12 feet apart, our posts 36 feet apart in the row. Our trellis system is practically the same as this. I guess it is the only system that is successful with the Evergreen. We don't use any cross pieces on the lower wires, we simply lay them over.

This widening out here doesn't do with us. Mr. Stahl made the assertion that these bearing canes without support will break off. We don't find that true in our yard. We find that they droop down on each side leaving the berries all right for the pickers to gather.

The third year, as I said, we posted and trellised as Mr. Stahl has shown you. We used an inch to an inch and a half piece of board, preferably a full inch thick, with a saw notch cut in each end. That makes a spreader or a rest. We weave our vines in and over. The third year we harvested a crop of about two tons to the acre. The following year we harvested about three tons to the acre. Last year, owing to the freeze, we got less than three tons to the acre.

The Evergreen is a semi-hardy plant. It is not what you would term a hardy plant. They kill nearly as easily as the Logan. That is they are damaged. You can kill the fruiting vine when it gets near zero. My tenant put up one acre of them while I was gone. I told him I wished he wouldn't do it. He said: "You never saw an Evergreen hurt." Yes, I have seen them killed four different seasons the past 30 years. That acre was killed just as dead as you could see anything killed. It reduced our yield on the total. This past year the last crop, we got just about four tons but as you know we had an exceedingly dry season, and the Evergreen doesn't agree with Volstead in any particular. He is a wet plant, he revels, he thrives in dampness. You can't hardly get water enough to hurt him during certain seasons of the year.

As to our cultivation, we plow as early in the spring as practical. We give it a thorough plowing. We commence at the center and plow out a furrow. We don't fall plow our ground because we sow vetch each year and it isn't practical. Then we turn around after we have run a disc over that and throw it away from the plant. As you come near the plant, we plow as deep as we can in the center, until we cut roots then we shallow our plow. We throw this back until we get next to the plant leaving a space of about eight inches, probably 20 inches at the plant.

Then we follow through with a grape hoe. It has a shear on a beam, it has a disc with a level to guide it by. You can shoot it in and out as you pass your plants. It is one of the greatest labor saving devices there is. You can put it in too deep, but you mustn't do that.

The Evergreen, if you cut a root off, will send up a shoot. They are great fellows to get out to the light again. The idea of digging the hole deep was to get the root system down deep. I dont know about covering up the crown. We have a very healthy yard. To combat that growth from the cut roots we had a cutter bar made about 4 3-4 inches wide. My alvice would be to have it not over three inches wide. Take a piece of tool steel and have the plowsmith draw it down to an edge, temper it for you, then fasten a couple of cultivator handles. With that, by holding the handles, you can put it into the ground one inch to four inches. It is a good weeder. You can run it close to the hills. It is very good.

Then I don't plow again until the coming year. After we have plowed, we use a disc harrow. After that we use a smoothing harrow if the ground is lumpy. Sometimes we have to use a clod masher. After that we use a spring tooth and disc until we are done harvesting our berries. In our yard at the present time, we have on an average 16 canes to the hill, a little over five years old, and they are hardy fellows too. It is a question in my mind whether I have them too close together in the row, but I drew my conclusions from a Loganberry patch. I had been putting them 8x8. I came to the conclusion that if my vines grew 12 to 18 feet, it was useless, that I could have them farther apart aand they would be easier to cultivate. So we set our next yard 8x10. I would make Evergreens nine feet between the rows and 12 feet the other way.

The bulk of your fruit is just a little ways beyond your top wire, that is about four and a half feet. The farther away you get from the crown, the smaller the berries. We are pruning our blackberries now, cutting eight to ten feet off of some of them.

Stahl: We usually have 30-foot canes, and set our plants farther apart. We use one horse for cultivating, an eight-inch plow, and for that reason we can put our rows seven feet apart.

As to picking, our pickers would a little rather, as a rule, pick Evregreens than Loganberries. The berries are always firm, and lay out where you can get at them. We don't aim to pick them when they are soft, but after they are filled out good. Our pickers pick in buckets. They empty into the 24 hallock crate. Our crates will make about 24 or 25 pounds.

A blackberry must have plenty of moisture, but the berry that is grown on the wet lands isn't the berry in quality, that is grown on the uplands. Part of our yard, the rows run east and west; part of them run north and south. That is on account of the contour of the land. Our soil is a clay loam, not exceedingly dark. It is not a light clay, but a medium. The soil is from 12 to 18 inches in depth. Then we come to a clay that is not so very hard; then we come to a hard pan that is exceedingly hard at any time of year.

Our yard slopes, the plants on the lower ground are 20 feet lower than those on the upper part. On that low ground is where we get our yields. We can grow them better down on a water level with the Willamette river. Our cannery made a difference of 1 cent a pound in favor of the cultivated berries up until this year, but the price they paid this year, they couldn't do it.

Q. Why does the cannery make a difference?

A. They claim there is more sugar in the berries, that it is a better quality berry. And I am satisfied of it. I went over into Pacific City where there were a lot of wild Evergreens, great big fellows one and a quarter inches long hanging there in bunches. I tried one, and thought that particular berry might be acid, but they were all just alike. They were rather a soft berry. The cultivated berry is firmer in texture. I have known vines in the woods that are thirty years old.

As to diseases, I haven't seen any. As to their clinging qualities, I think they have got the fellow that likened woman to the clinging vine, backed off the map. They will cing, there isn't any doubt about that.

Q. Do you use any fertilizer except your vetch?

A. We haven't so far. Ours was virgin land. The forest had been on there for hundreds of years, it is pretty rich. Our Loganberries we have been fertilizing. We used several hundred tons of barnyard manure, also the phosphate and nitrates.

Q. Are your cultivated berries any more apt to sunburn?

A. We haven't any trouble with our Evergreens sunburning. The Evergreen with us doesn't commence to bloom until the Loganberry is practically done. It is at least two weeks later than the Loganberry, then they begin to bloom and the picking is at least two weeks later than the Loganberry so it makes a very good berry to diversify your planting.

I am kind of a cooperation fiend. I didn't quite finish my berry story either. I have got bit so much that I have come to believe firmly that each and every one of these fellows is working for himself. He isn't working for me at all. It didn't get me anything.

Q. It seems that all these things come back onto the grower?

A. Yes, sir, without question. You know, looking here at this body of people, not including myself,—it is a pretty independent looking lot of people. Sometimes I wonder why it is that we allow the legislature to go up there and say that we have got to support a fair in Portland, in the face of the fact that you are paying more taxes than you can possibly get out of your investment.

So it is with cooperation. We have been bled and bled white. We have built canneries all over this valley. I have helped, and you have helped. You can't deny it. And yet today, if the question was sprung, of let's build a cannery, you would say, it costs too much money, we can't do it. You know yourself that it can be done. That we could do it. We can do it just as well as the Oregon Packing Company. If you get the right man, we will make just as much money as they have made, probably more.

Q. Won't the good men at the head get the profits?

A. Not if it is rightly handled. Some men say "The organization isn't doing what it ought to do." It is not "the organization," but it is "our" organization. I say, why don't you go up and tell those fellows about it if you have any good ideas? That is what they are there for. If they don't, they will soon be out. So far, I have nothing but words of praise. There have been some little mistakes made, but who of you that has done any business that hasn't made a mistake? You are bound to do it. Then they were caught in a financial trap that was enough to try pretty solid old firms in business, while this is just a new proposition.

We have got to make up our minds not to put the Hunt Canning Co. out of business, not to put the Oregon Packing Co. out of business, but to demand of them a right to live. If we can't do it in any other way, we will build a cannery and fix it so they will have to come to us, or we will do our own canning.

Each and every one of us that had a little grouch, or had anything really worth while on his mind, if we would come up and talk it over with the management, it might give them an insight to something else. It is a very poor head that hasn't sometimes something of value to the community. I note there are several members here. I would like each and every one of them to boost the organization. If you have a neighbor that is a little doubtful, tell him about the canneries he has helped build, and if it is necessary, let us build one of our own.

There is an argument going on that we are to kill off the canning industry of Salem. A mistaken idea. I don't think there ever was any such idea thought of. We want those canneries. We need those canneries. What we need is to pay what we want for our product, and get enough so we can live, and if we do get in that situation, don't ask the canneryman so much that he will have to go out of business. Let him stay in business.

I contracted my berries at a figure—I don't think I will tell you—it looked like good business. Looking back now, I don't know whether I had one drink too many or one too little. But my people treated me very nicely. I am not going to name the firm I contracted with. I think that the manager—he is not the owner—has a fellow feeling, and business enough that in a good many cases he treats the people right. I haven't a great deal of kick coming. We got 4 cents this year and I noticed that Mr. Holt got quite a little more and I expect they made more than Mr. Holt. But I am satisfied that we are not getting enough. I don't believe we can grow Evergreens for less than 4 cents. The training is the worst proposition we have got. I wouldn't advise any one planting a large acreage unless they were assured of help to handle.

I believe in cooperation. I believe we have done as well as could be expected, and perhaps a little better. I believe our officers at the present time, are doing as much for us and probably a good deal more than anyone we could have gotten at the price they are being paid. It is being said our overhead is too heavy. Who is doing that? I leave it to you to guess. They say again, there has been a little carelessness here and there in the management. Who is doing that? What is it for? It isn't to promote and build up the organization is it? Rather it is to tear it down. And if it wasn't a fact that this thing is hurting, they wouldn't pay any attention to us. They are doing every thing they can to weaken the organization, telling people that the people in the office are getting swell-headed, and so forth.

DRYING LOGANBERRIES

By J. J. McDonald

I know you don't want me to waste very much time in telling you people things I am satisfied you already know, some of you perhaps more than I do. The marketing of the fruits is of a great deal more importance than getting the fruit ready because of the fact that if you can get your stuff to market, there are enough people here to produce Logans enough to supply a great deal larger demand than we have had for them yet. Although it is very important to have stuff prepared for market, it takes some time to learn how to prepare some kinds of fruit, and the Logan is one fruit that a great many people today are very much interested in.

It fills more places than any one fruit that any of us could undertake to produce. Its peculiar acids and flavoring and other ways that it can be used and the amount that can be produced on a very small piece of ground. We have a great many Loganberry plants that run well for a few years and have to be replanted.

In drying Logans people differ wonderfully on the condition the Logan should be in and the condition that it is after it is dried. There is a great deal of fruit on the market today that sell on looks, not altogether on quality or flavor, The Logan looks better perhaps to go onto the market dried before it gets thoroughly ripe. But it has not proven to be what the consumers want, they want it thoroughly ripe, and it can be thoroughly ripe and still not go down.

The Logan wants a good strong purple color, not too ripe to bruise or mash and when you break the cells, you lose juice and lose weight. The more sugar there is in the berry, the riper it is up to that time and for the drying qualities, you get it the riper the fruit just so that it doesn't go down.

There is one great trouble about the Loganberry in particular. There are so many ways to use the Loganberry now and if we could only get to some system that you could market for the green, for the canning from solid that are more moist, you would find you will get more money for them than you will with berries from the hills, from the higher ground. I found in drying berries for twelve to fourteen years, that we had no trouble in getting 1-5 from berries that were grown on higher ground, that hasn't quite so much moisture in.

There was a question asked in regard to handling stuff under one head. I would like to ask any farmer who has to hire a foreman or manager, if he would want to pay $300 or $400 a month to three or four managers. He knows it is cheaper to have one good manager and it is a good deal better than to have several. It is the same way in the cooperative movement. The greater the head, well managed, the cheaper it is for the men who are going to put their stuff on the markets. The best condition that we can get our fruit in to go onto the market is the thing to do. They differ in driers, differ in the way of putting on the trays. We found out that in drying Logans, when the tray is once covered, you will dry more berries and get them off better than to put on two layers. I found with 12 to 14 pounds of berries we have better results, handled more berries in 24 hours than if we tried to put 16-18 pounds on a 30x36-inch tray.

Another thing we found when they come in the creates of 24 hallocke, if they are well filled, every crate makes two trays. Another thing is which is the quickest method of getting onto the trays with just as little handling, and an expert trayer can tray from two to four trays in five minutes and put them on in nice shape, where he puts 12 pounds to the tray. They will go through the drier quicker.

The first experience I had was in a stack drier. We could put your trays in 19 high. We found it was not a success. We could not get the heat to the top trays soon enough, they would run together. I found a tunnel drier was the best, and I thought once that a long tunnel, but I am not going to say as regards that, as it takes a long while to get them through.

We experimented at my place and after I got the rush over I turned one tunnel over to Mr. Brown from O. A. C. We found the nicest berries were dried in 14 hours.

We put those trays in when the tunnels were hot, probably 110 or 120 where they went in and 150 to 165 where we took them off. Put those trays about half way down to start with, and they came off without any drip whatever and looked almost like the natural berry and we had not over 12 to 14 pounds to the tray.

If you can put berries in good condition through a drier in fourteen to eighteen hours you all realize you are going to save fuel and labor in doing that. Where they are piled too much we have been as long as 25 hours getting through. That is too much difference and your berries will run together. You want your berries to come out separate.

We tried drying berries picked green and I saw several tons piled up in West Salem and they claimed they got rid of those berries, for pies but I noticed that they didn't handle that kind any more. The greatest trouble I see handling berries to dry them is that out of the same yards you are picking berries for the cannery and for the barrel, and also for the drier and you cannot regulate your picking very much with two or three pickers picking three or four grades of berries. If it could be centralized in some way that the people under one association could handle all your berries, they could regulate that. You can't.

It shows again that cooperation, getting under some head, would be more of a success in handling all your fruits because they would arrange for the canning, they would have a berry grown where there was more moisture and would handle all those berries in that way.

If they wanted berries for drying they would have higher grounds and have all those berries dried for the markets that they had for that product, etc.

That is the only way I see to ever get the berries in just the right shape for the market. I believe most of you understand this just as well as I could tell you. While perhaps I have had a little more experience than others, it is a very easy thing to handle them, and I think it should be taken more in a cooperative movement, and diseases and other things that are bothering people's fruits.

If we could centralize, have one drier that would handle a hundred tons a day, have machinery to handle your stuff, grade all your prunes before they go in, your stuff would come out graded and you would not have so much expense sorting prunes and having what they call dobies or under dried prunes.

If these things could be centralized, if people could get together—if a thing is good for the small grower, it is good for the big grower, and he is the one to push those things because he is better fixed to do them than the small grower. The small grower is more at the mercy of the corporations. If we could all get together and get Mr. Brown and some of those with 80 or 100-acre tracts to come in, wouldn't it be better? Any of us can grow the fruit but we can't get out individually and get the markets. I have been pleased to see so many out and to see some of them come as far as they have.

SOME LOGANBERRY EXPERIENCES

By Sam Brown

My first crop of Loganberries was in 1908, from a 15-acre yard. Fortunately, yes, very fortunately, it was a very small crop. The less we had the less we lost. The enamel can was not known at that time and the Loganberry likes to eat itself out of the tin as fast as it is put in. Canners were shy. Drying, juicing and other methods of preserving were not known at that time—not known commercially. The only way we had of disposing of berries was through commission merchants.

Very unfortunately in 1909 we were cleaned properly. Fortunately in 1910 the enamel can was past the experimental stage and canneries began to take the berries.

He said "yes," finally, "I will take a shot at them and give you 2½ cents, and you furnish your own crates." You bet I jumped at it. Didn't wait a minute. The crates were to be returned to us. In 1910 I made a little money because labor was cheap, got the berries picked for a cent and got some money back on my investment.

In 1911 and 1912 we let them lie on the ground and the die-back killed so many, and we got a very little crop.

We allow only a certain number of canes. We never aim to train up every cane that grows and have found through experience that it is a bad proposition. I do not care to have any great big record breaking crop.

At the same time in pruning out your berries as in pruning out your apple or pear trees, a better quality of fruit is obtained. Berries are going to be paid for according to quality, the same as any other lines of fruit, apples or anything else, as they should be.

I want to say—to touch on the value to you now—of what I think of sticking to one firm or one marketing organization. If you are a member of this organization, stick by it, stay by it with all the energy in you. Not only give it your berries but your moral support. It has its trying times just as well as any other organization. Stay by it. Co-operation means exactly what it says. If you do not stay with the association, sooner or later it is bound to go down to failure and ruin. If you do stay with them it means success. They are a boon to small growers.

I believe, right down in my heart, that without co-operative organizations like this, small growers can not exist. By combining your crops you have a sufficient quantity to make it an object for buyers to come after them. They will come after them if the demand is more than the supply, but what you want to know and what I want to know is that they will take it when the supply is equal to or greater than the demand. We can not afford to sell the crop one year and lose it the next two or three.

Business is gradually getting down now to a stable line and not an experiment any more. We have had exceedingly high prices and exceedingly low prices. I hope we will never see either one of them again. We are entitled to fair prices for our crop and fair prices for our investment and trouble, but not entitled to the exorbitant prices gotten in the year 1920, or the very low prices in the year 1921. There should be and there will be a happy medium and nothing is going to bring that about sooner than this organization.

As to the method of cultivation. We bought a little Holt caterpillar seven years ago and it has proven a most excellent machine backed by an excellent company, whose interest only begins in you when you buy a tractor. I am not an agent for the Holt people, but I have to give everybody his due. We are running that tractor yet. When we started out in the tractor business there were no tools made to use with the tractor. We had to design our own tools. We invented some and improved others until we have a nice line to work with.

We only keep two horses now on our ranch of two hundred and fifty acres, and they are eating their heads off. Would like to get rid of them.

Now as to the method of clltivation. We use a very intensive but shallow method of cultivation. We have found by experience that we can do a lot of harm by cultivating too deep. We make drainage ditches in the fall and sow vetch for a cover crop. We would just as leave think of going without cultivation in the spring as going without sowing vetch in the Loganberries especially.

We got vetch in about one third of our yard this fall but did not get it all done. Our vetch grows about three and four feet high. It is a wonderful cover crop and fertilizer. We sow it every year.